**MOBILE DEVICES BUSINESS**

**PRODUCT SAFETY AND COMPLIANCE**
**EMC LABORATORY**

**EMC TEST REPORT**

**Test Report Number** – 24934-1

**Report Date** – June 6, 2012

The test results contained herein relate only to the model(s) identified. It is the manufacturer's responsibility to assure that additional production units of this model are manufactured with identical electrical and mechanical characteristics.

As the responsible EMC Engineer, I hereby declare that the equipment tested as specified in this report conforms to the requirements indicated.

Signature: Name: Albert J. Patapack

Title: EMC Engineer Date: June 6, 2012

This report must not be reproduced, except in full, without written approval from this laboratory.

THIS REPORT MUST NOT BE USED TO CLAIM PRODUCT ENDORSEMENT BY UKAS OR ANY AGENCY OF THE U.S. GOVERNMENT.

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# Test Report Details

| | |
|---|---|
| Tests Performed By: | ADR Testing Service<br>Location Code: ADR LV<br>Motorola Mobility Inc<br>Product Safety and Compliance Group<br>600 North US Hwy 45<br>Libertyville, IL 60048<br>PH (847) 523-6167 Fax (847) 523-4538<br>FCC Registration Number: 316588<br>Industry Canada Number: 109O-1 |
| Tests Requested By: | Motorola Mobility Inc.<br>600 North US Hwy 45<br>Libertyville, IL 60048 |
| Product Type: | Cellular Phone |
| Signaling Capability: | GSM 850/1900, WCDMA 850/1700/1900<br>HSDPA, HSUPA, EDGE, GPRS, 802.11a/b/g/n,<br>LTE Band 4/17, Bluetooth LE + EDR |
| FCC ID: | IHDP56MB4 |
| Serial Numbers: | LDNB270024, LDNB270027 |
| Testing Complete Date: | March 15, 2012 |

## Applicable Standards

All tests and measurements indicated in this document were performed in accordance with the Code of Federal Regulations Title 47 Part 2, Sub-part J as well as the following parts:

__X__Part 2
__X__Part 22 Subpart H - Public Mobile Services
__X__Part 24 Subpart E – Personal Communications Services
__X__Part 27 – Miscellaneous Wireless Communications Services

Applicable Standards: ANSI 63.4 2003, ANSI/TIA-603-C-2004,
RSS-Gen Issue 3, RSS-132 Issue 2, RSS-133 Issue 5,
RSS-139 Issue 2

**Summary of Testing**

| Test # | Test Name | Pass/Fail |
|---|---|---|
| 1 | RF Power Output | NA |
| 2 | ERP (Effective Radiated Power) | Pass |
| 3 | EIRP (Effective Isotropic Radiated Power) | Pass |
| 4 | Occupied Bandwidth | Pass |
| 5 | Spurious Emissions at Antenna Terminal | Pass |
| 6 | Field Strength of Spurious Emissions | Pass |
| 7 | Frequency Stability | Pass |

| Test # | Test Name | Margin with respect to the Limit |
|---|---|---|
| 1 | RF Power Output | NA |
| 2 | ERP (Effective Radiated Power) | See results |
| 3 | EIRP (Effective Isotropic Radiated Power) | See results |
| 4 | Occupied Bandwidth | See Plots |
| 5 | Spurious Emissions at Antenna Terminal | See results |
| 6 | Field Strength of Spurious Emissions | See results |
| 7 | Frequency Stability | See results |

The margin with respect to the limit is the minimum margin for all modes and bands.

**General and Special Conditions**

This product utilizes an internal battery that is not removable. When applicable, EMC testing was performed with the internal battery fully charged. Where a battery could not be used due to the need for a controlled variation of input voltage, an external power supply was utilized.

All testing was done in an indoor controlled environment. The temperature and the relative humidity were maintained within the ANSI C63.4 2003 Standard requirements during the entire duration of testing.

# Equipment and Cable Configurations

The EUT was tested in a stand-alone configuration that is representative of typical use.

| Manufacturer | Equipment Type | Model No. | Serial Number | Calibration Due Date |
|---|---|---|---|---|
| Rohde & Schwarz | Receiver | ESIB40 | 100226 | 3/30/2012 |
| Hewlett Packard | EMC Analyzer | E7405 | US39440191 | 9/23/2012 |
| Agilent | MXA Signal Analyzer | N9020A | US46470586 | 01/20/2014 |
| Agilent | Signal Generator | 83712A | 3429A00286 | 3/26/2013 |
| ETS | DRG Horn Antenna | 3115 | 6222 | 3/16/2012 |
| A. H. Systems | DRG Horn Antenna | SAS 200/571 | 365 | 8/24/2012 |
| ETS | Log-Periodic Antenna | 3148 | 1188 | 12/12/2012 |
| ETS | Biconical Antenna | 3110B | 3369 | 12/14/2012 |
| Attenuator | Weinschel | AS-6 | 6675 | NCR |
| Attenuator | Weinschel | AS-6 | 6677 | NCR |
| Thermotron | Environmental Chamber | S-4 | 31580 | 11/16/2012 |
| Agilent | Power Meter | E4416A | GB41293258 | 7/15/2013 |
| Agilent | Power Meter | E4416A | GB41293263 | 9/14/2013 |
| Agilent | Power Sensor | E9323A | US40412063 | 8/19/2012 |
| Agilent | Power Sensor | E9323A | MY44420850 | 9/08/2012 |
| Agilent | Microwave Preamplifier | 8449B | 3008A01442 | 9/22/2012 |

Note that the Agilent power meter, the Signal Generator and the MXA signal analyzer are on a two-year calibration cycle. All other equipment is on a one-year calibration cycle. All testing was performed using equipment that was within calibration at the time that the test was performed. No equipment listed in the table above was used after the specified calibration due date. If, during the course of product testing, a piece of equipment went out of calibration and that piece of equipment was needed to complete product testing, a similar piece of calibrated equipment was substituted. If a substitution was made, that new piece of equipment would be listed in the above table along with the piece that was removed from service.

# Measurement Procedures and Data

## RF POWER OUTPUT

### Measurement Procedure

The RF output port of the Equipment Under Test, EUT, is directly coupled to the input of an Agilent power meter through a 20dB passive attenuator, adaptor (if needed), and specialized RF connector. The average power output is measured for all channels.

### Measurement Results

**GSM 850**

| Frequency (MHz) | Power (dBm) |
|---|---|
| 824.2 | 33.51 |
| 836.6 | 33.44 |
| 848.8 | 33.53 |

**GSM 1900**

| Frequency (MHz) | Power (dBm) |
|---|---|
| 1850.2 | 30.63 |
| 1880.0 | 30.21 |
| 1909.8 | 30.30 |

**EDGE 850**

| Frequency (MHz) | Power (dBm) |
|---|---|
| 824.2 | 28.73 |
| 836.6 | 28.82 |
| 848.8 | 28.72 |

**EDGE 1900**

| Frequency (MHz) | Power (dBm) |
|---|---|
| 1850.2 | 27.87 |
| 1880.0 | 27.80 |
| 1909.8 | 27.84 |

Conducted Power was measured according to the "SAR Measurement Procedure for 3G Devices" released on October, 2007. .

| Band | Frequency (MHz) | Conducted power (dBm) for WCDMA modes | | Conducted Power (dBm) for WCDMA – HSDPA (Rel 5) Modes | | | |
|---|---|---|---|---|---|---|---|
| | | RMC | AMR | Subtest 1 | Subtest 2 | Subtest 3 | Subtest 4 |
| WCDMA 850 | 826.4 | 23.97 | 23.87 | 23.89 | 23.89 | 23.92 | 23.84 |
| | 836.0 | 23.95 | 23.89 | 23.92 | 23.91 | 23.94 | 23.96 |
| | 846.6 | 23.82 | 23.90 | 23.91 | 23.90 | 23.86 | 23.84 |
| WCDMA 1700 | 1712.4 | 24.00 | 24.09 | 24.05 | 24.06 | 24.06 | 24.08 |
| | 1732.5 | 24.09 | 24.15 | 24.12 | 24.13 | 24.13 | 24.14 |
| | 1752.6 | 24.15 | 24.15 | 24.08 | 24.06 | 24.11 | 24.12 |
| WCDMA 1900 | 1852.4 | 23.90 | 23.98 | 23.91 | 23.94 | 23.91 | 24.04 |
| | 1880.0 | 23.99 | 23.91 | 23.90 | 23.92 | 23.85 | 23.82 |
| | 1907.6 | 23.80 | 23.91 | 23.93 | 23.86 | 23.89 | 23.85 |

| Band | Channel | Conducted Power (dBm) for WCDMA – HSPA (HSUPA/HSDPA-Rel 6) Modes | | | | |
|---|---|---|---|---|---|---|
| | | Subtest 1 | Subtest 2 | Subtest 3 | Subtest 4 | Subtest 5 |
| WCDMA 850 | 826.4 | 23.90 | 23.89 | 23.85 | 23.91 | 23.91 |
| | 836.0 | 23.90 | 23.91 | 23.96 | 23.95 | 23.93 |
| | 846.6 | 23.89 | 23.93 | 23.93 | 23.92 | 23.85 |
| WCDMA 1700 | 1712.4 | 24.15 | 24.10 | 24.09 | 24.13 | 24.07 |
| | 1732.5 | 24.20 | 24.16 | 24.16 | 24.18 | 24.20 |
| | 1752.6 | 24.09 | 24.12 | 24.10 | 24.03 | 24.06 |
| WCDMA 1900 | 1852.4 | 23.94 | 24.06 | 23.99 | 24.01 | 24.09 |
| | 1880.0 | 23.93 | 23.93 | 23.88 | 23.89 | 23.86 |
| | 1907.6 | 23.85 | 23.84 | 23.92 | 23.88 | 23.87 |

Based on the power measurements, all WCDMA testing was performed in RMC mode.

# RADIATED POWER (EIRP AND ERP)

## Measurement Procedure

The EUT was tested in a 16' anechoic chamber with a 2-axis position system that permits taking complete spherical scans of the EUT's radiation patterns. For all tests, the EUT was supported in a free space type environment, vertically oriented in the chamber.

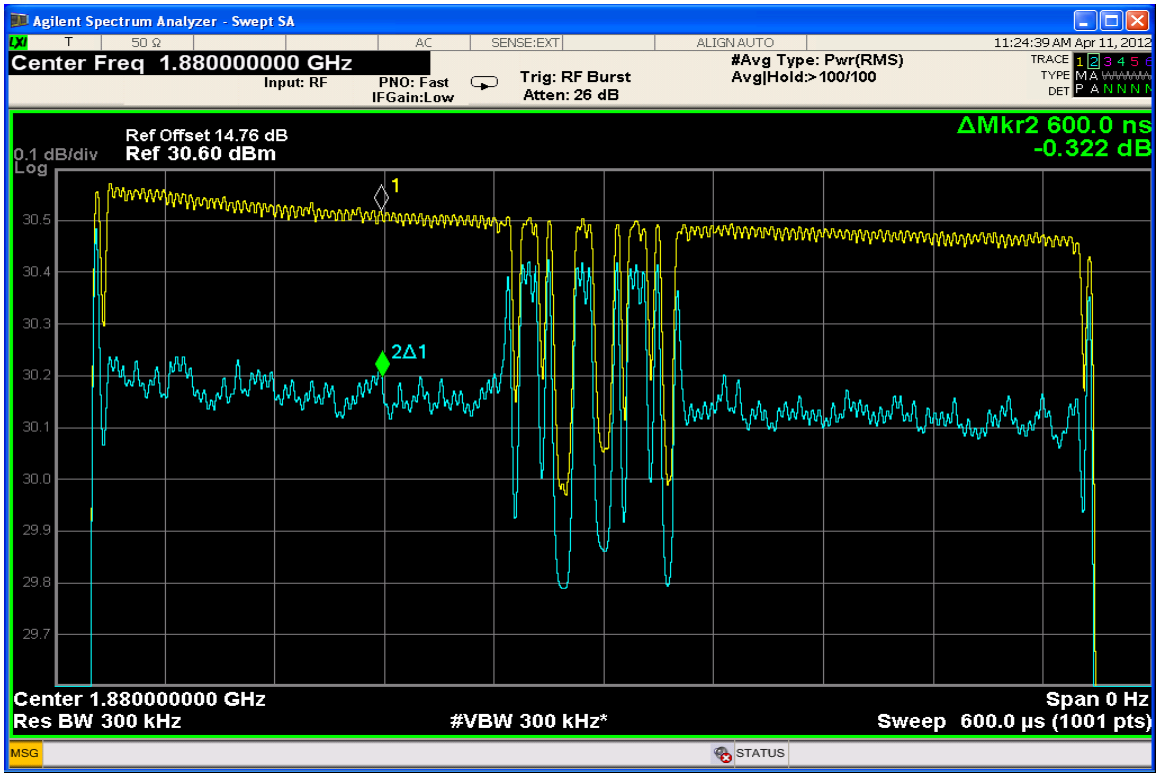
All measurements were made with the EUT placed in a call using a mobile station test set. The EUT was weakly coupled to the test set and configured to transmit in full data rate mode. Radiated power was measured at each 15 degree step. The radiated power was measured using a Rhode & Schwarz FSP Spectrum Analyzer using the Average Detector for all bands. From these measurements, the software calculates the angle at which maximum radiated power occurs for each case, and the radiated power at this angle was extracted from the data. To get ERP (effective radiated power referenced to a half-wave dipole), subtract 2.1 dB from these numbers.

The EUT was tested in all configurations and the highest power level is reported.

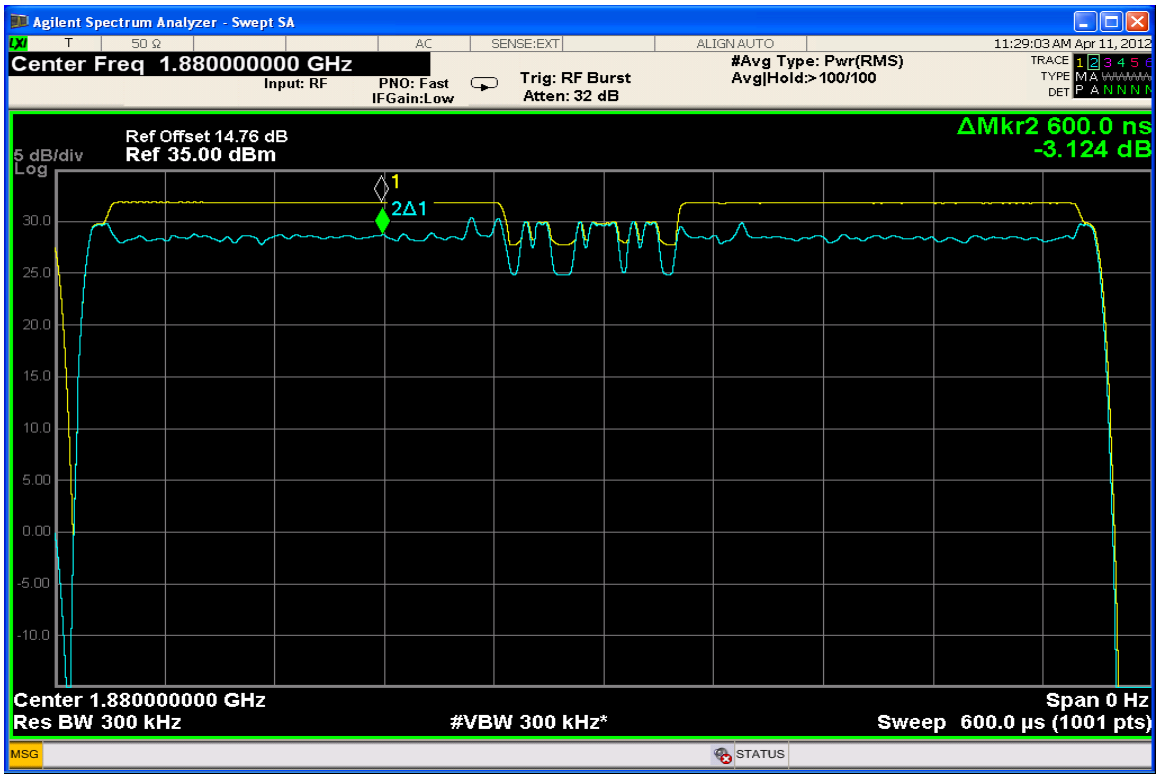
## Measurement Results

| Band | EIRP dBm | ERP dBm |
|---|---|---|
| | | |
| GSM 850 | 31.6 | **29.5** |
| GSM 1900 | **30.3** | 28.2 |
| EDGE 850 | 27.4 | **25.3** |
| EDGE 1900 | **27.5** | 25.4 |
| WCDMA 850 | 22.3 | **20.2** |
| WCDMA 1700 | **27.6** | 25.5 |
| WCDMA 1900 | **28.8** | 26.7 |

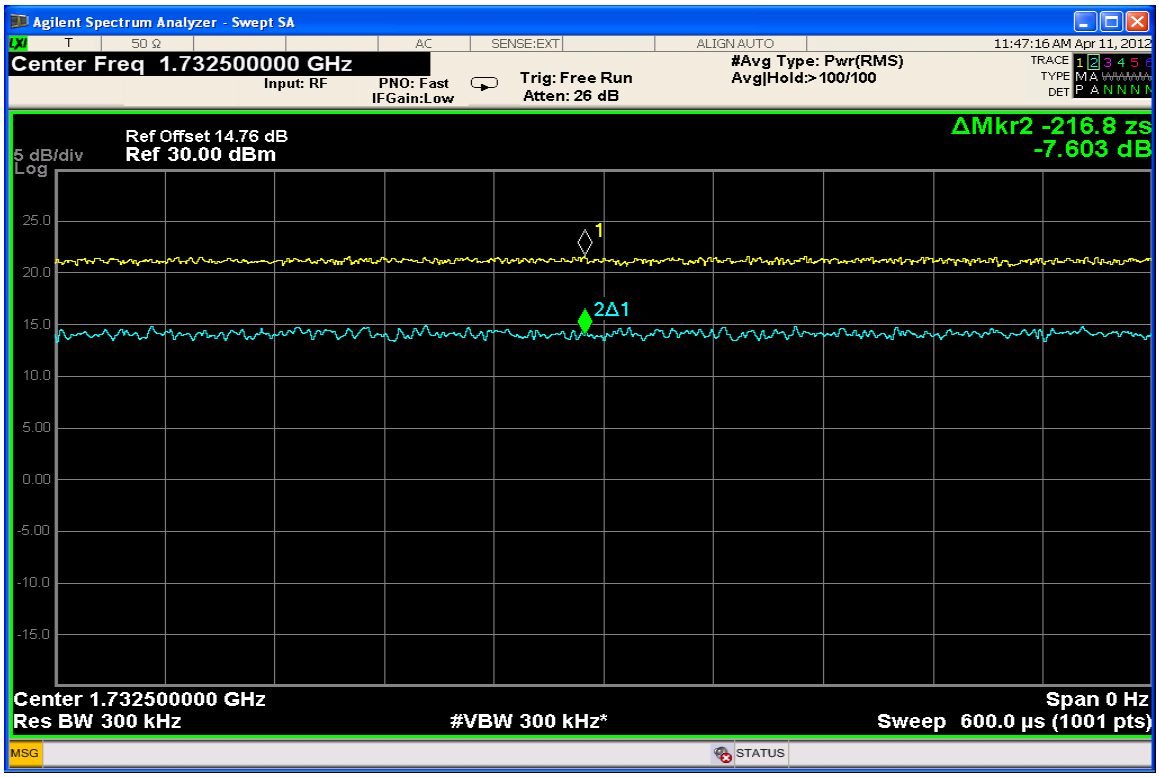
For the PAR plots below, except for the detector used and the trace type, all instrument settings are the same for both plot traces. The trace 1 type is Max Hold and the detector is peak. The trace 2 type is average and the detector is average.



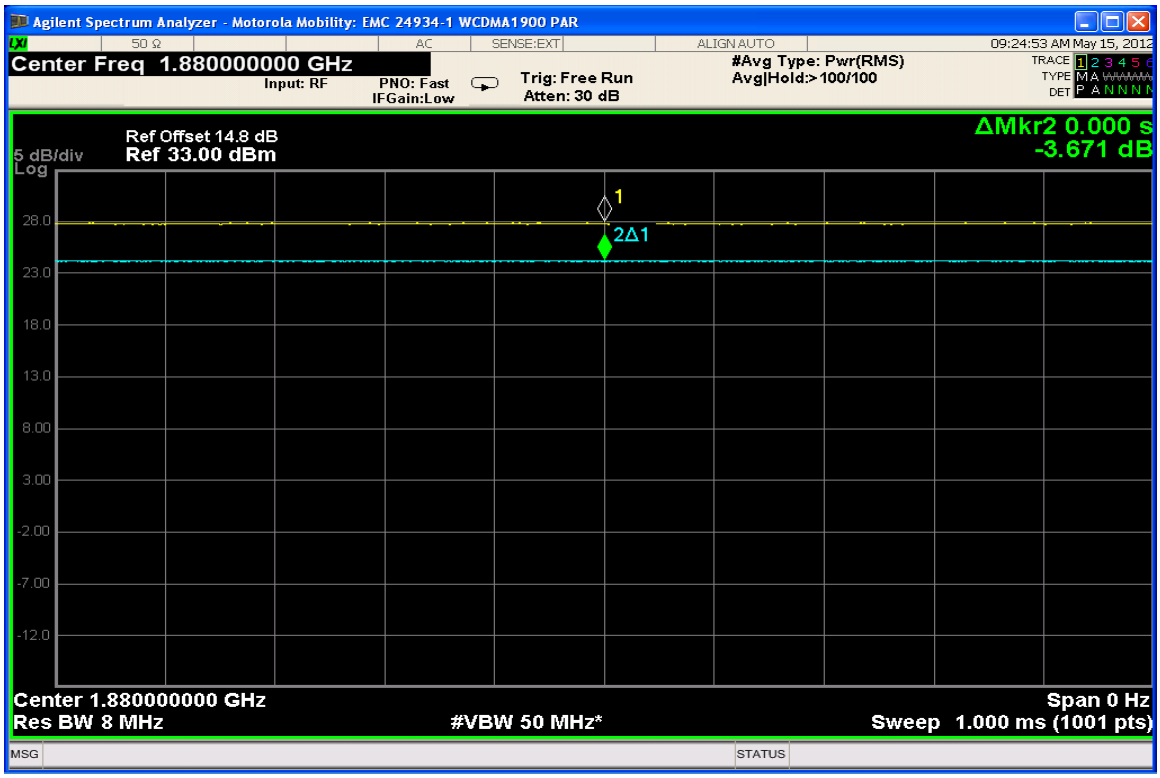

**GSM 1900 – PAR Plot**




**EDGE 1900 – PAR Plot**




**WCDMA 1700 – PAR Plot**




**WCDMA 1900 – PAR Plot**

# OCCUPIED BANDWIDTH

## Measurement Procedure

The RF output port of the EUT is directly coupled to the input of the EMC analyzer through a specialized RF connector and a 10dB passive attenuator. The amplitude of the spectrum analyzer is corrected for the attenuator and any other applicable losses. The analyzer is set for Peak Detector and each trace is set for Max Hold. A fully charged battery was used for the supply voltage.

The middle channel within the designated frequency block was measured. For digital modulation, the lower and upper band edge plots are displayed.

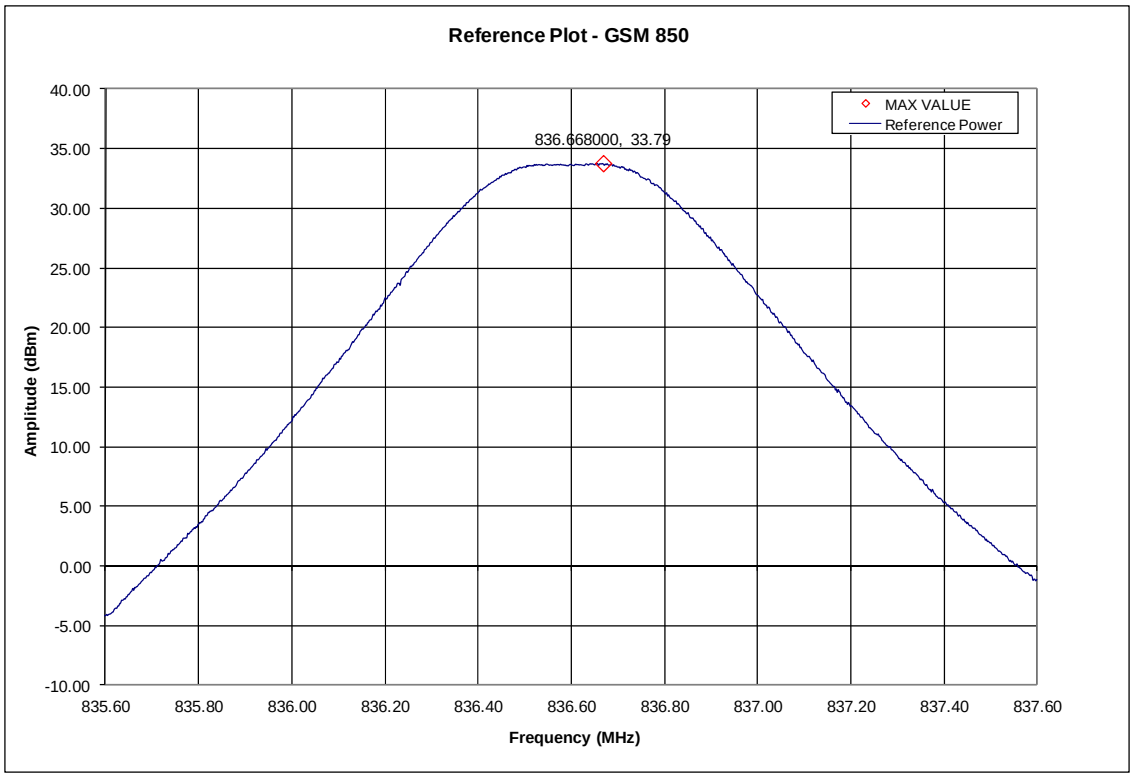
Measurement Results
Attached

| | Equipment Settings | | | | | |
|---|---|---|---|---|---|---|
| **Plot** | Resolution Bandwidth (kHz) | Video Bandwidth (kHz) | Sweep Points ( # ) | Trace Mode | Detector | Samples ( ≥ # ) |
| Reference Plot - GSM 850 | 300 | Auto | 1001 | Max Hold | Peak | 30 |
| OCBW - GSM 850 | 3 | Auto | 1001 | Max Hold | Peak | 30 |
| Lower Band Edge - GSM 850 | 1 | Auto | 2004 | Max Hold | Peak | 30 |
| Upper Band Edge - GSM 850 | 1 | Auto | 2004 | Max Hold | Peak | 30 |
| Reference Plot - GSM 1900 | 300 | Auto | 1001 | Max Hold | Peak | 30 |
| OCBW - GSM 1900 | 3 | Auto | 1001 | Max Hold | Peak | 30 |
| Lower Band Edge - GSM 1900 | 1 | Auto | 2004 | Max Hold | Peak | 30 |
| Upper Band Edge - GSM 1900 | 1 | Auto | 2004 | Max Hold | Peak | 30 |

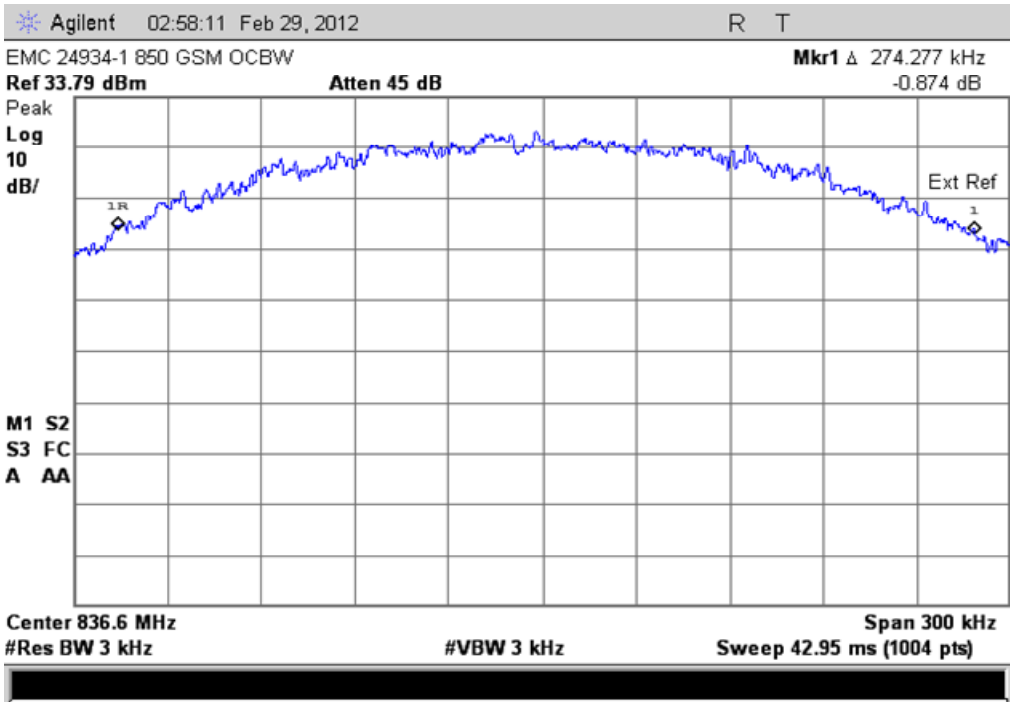
Notes: 1) When the video bandwidth is set to Auto the video bandwidth self adjusts for ³ the resolution bandwidth.

2) The plotted data shown for the band edge measurements is representative of data taken with a true 3 kHz resolution bandwidth filter. The raw data was taken using a 1 kHz resolution bandwidth and was integrated to produce a response representative of data taken using a true 3 kHz resolution bandwidth filter.

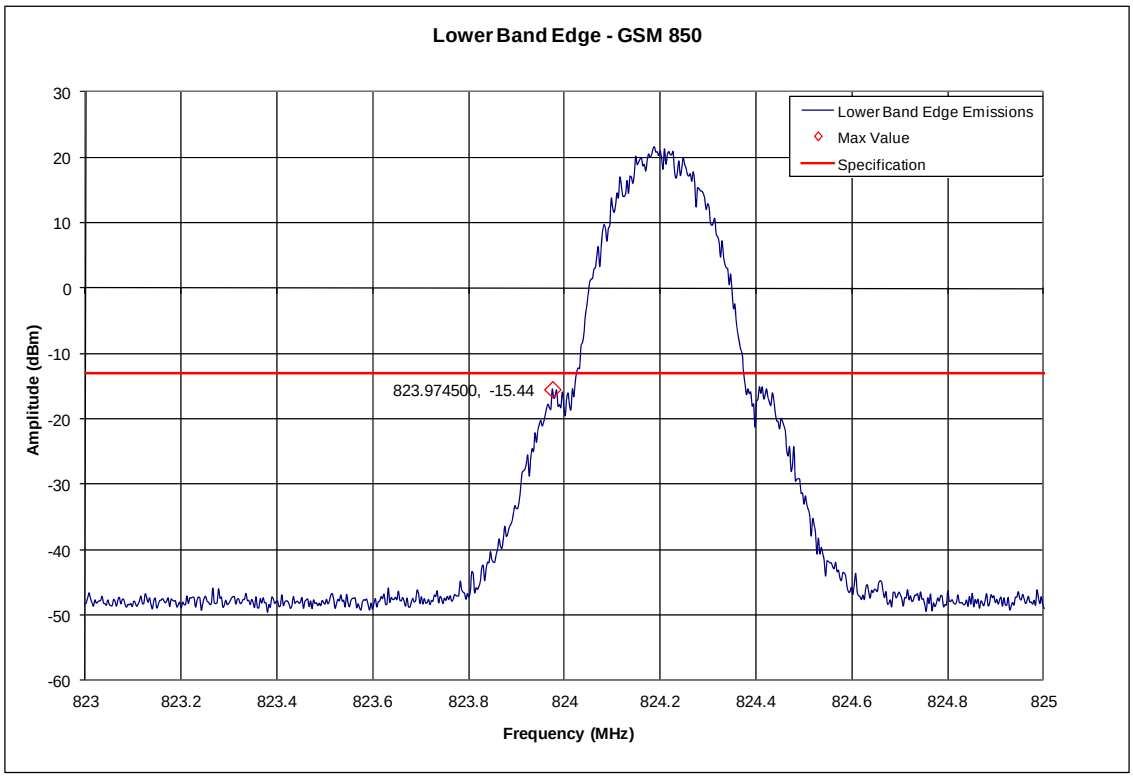
## Measurement Results – GSM 850



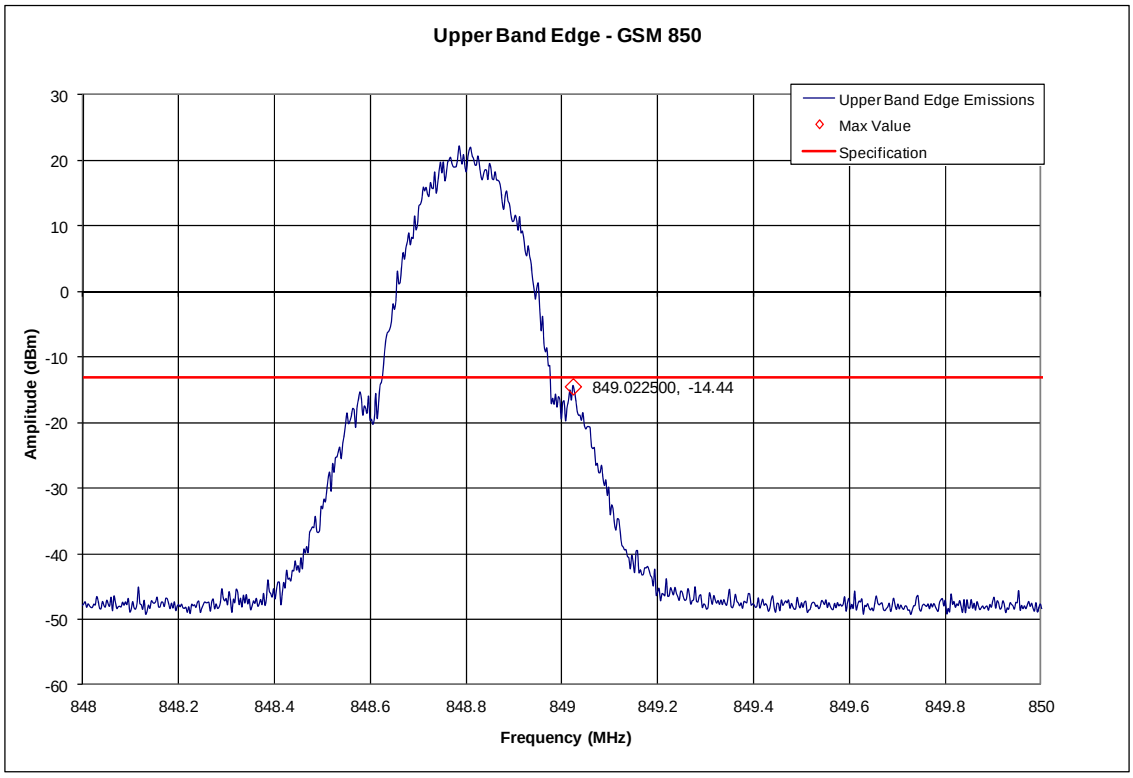

**GSM 850 – Reference Level Plot – Channel 190 (836.60 MHz)**




**GSM 850 – Channel 190 (836.60 MHz) – Occupied Bandwidth**

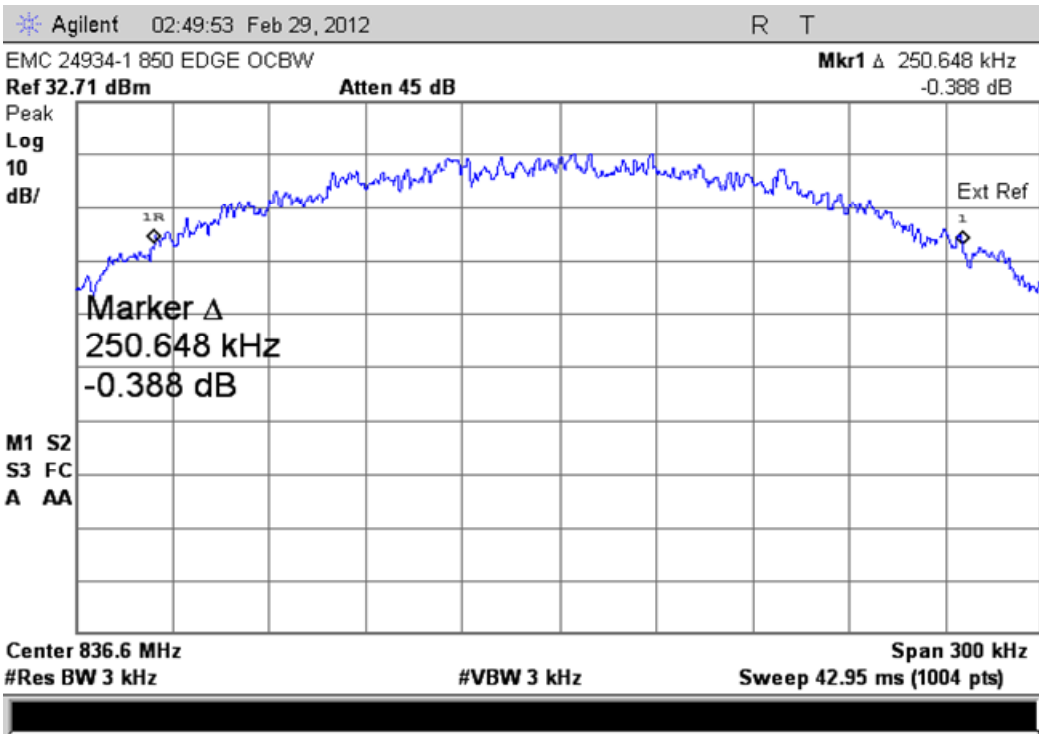



**GSM 850 – Lower Band Edge – Channel 128 (824.2 MHz)**

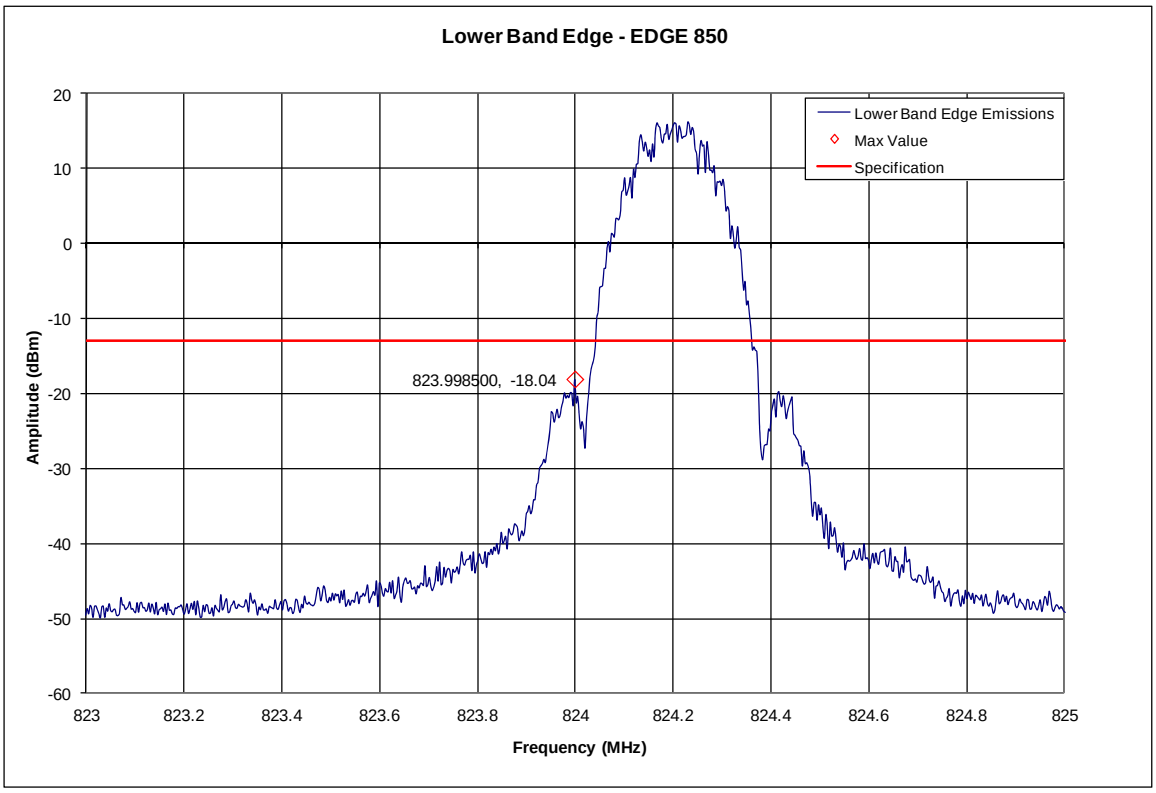



**GSM 850 – Upper Band Edge – Channel 251 (848.8 MHz)**

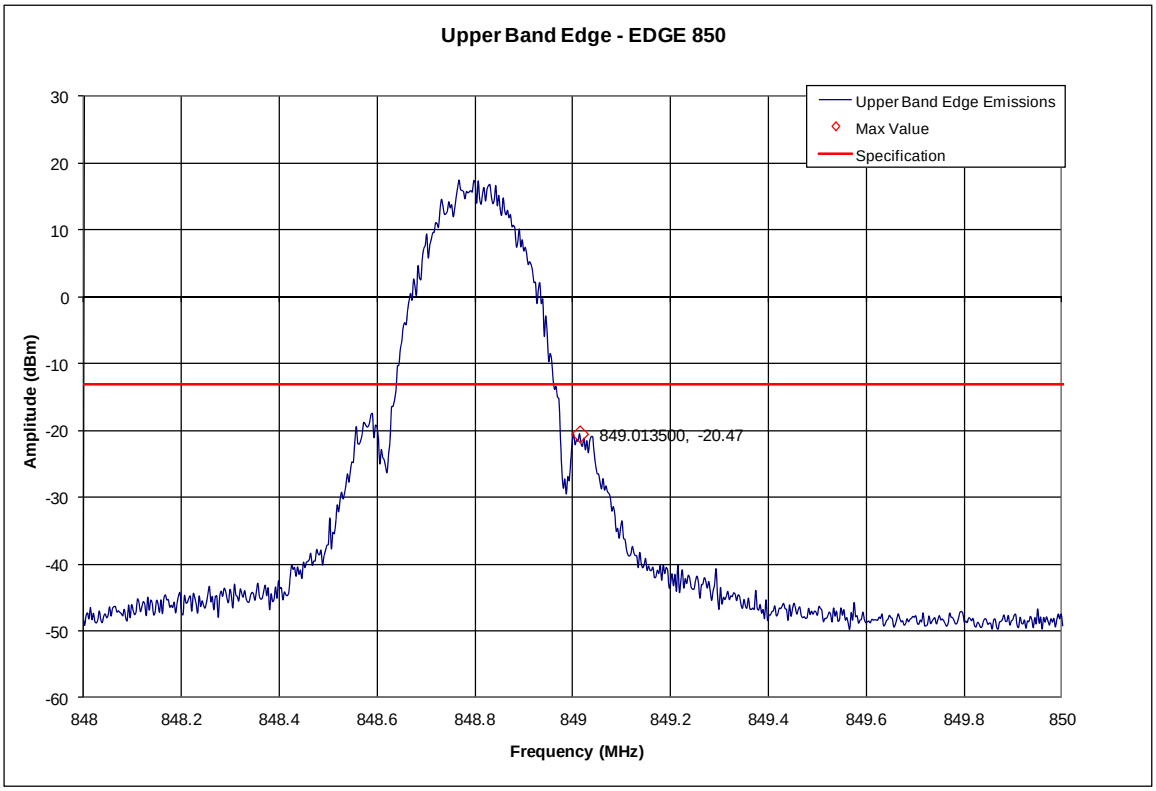
**Measurement Results – EDGE 850**




**EDGE 850 – Channel 190 (836.60 MHz) – Occupied Bandwidth**

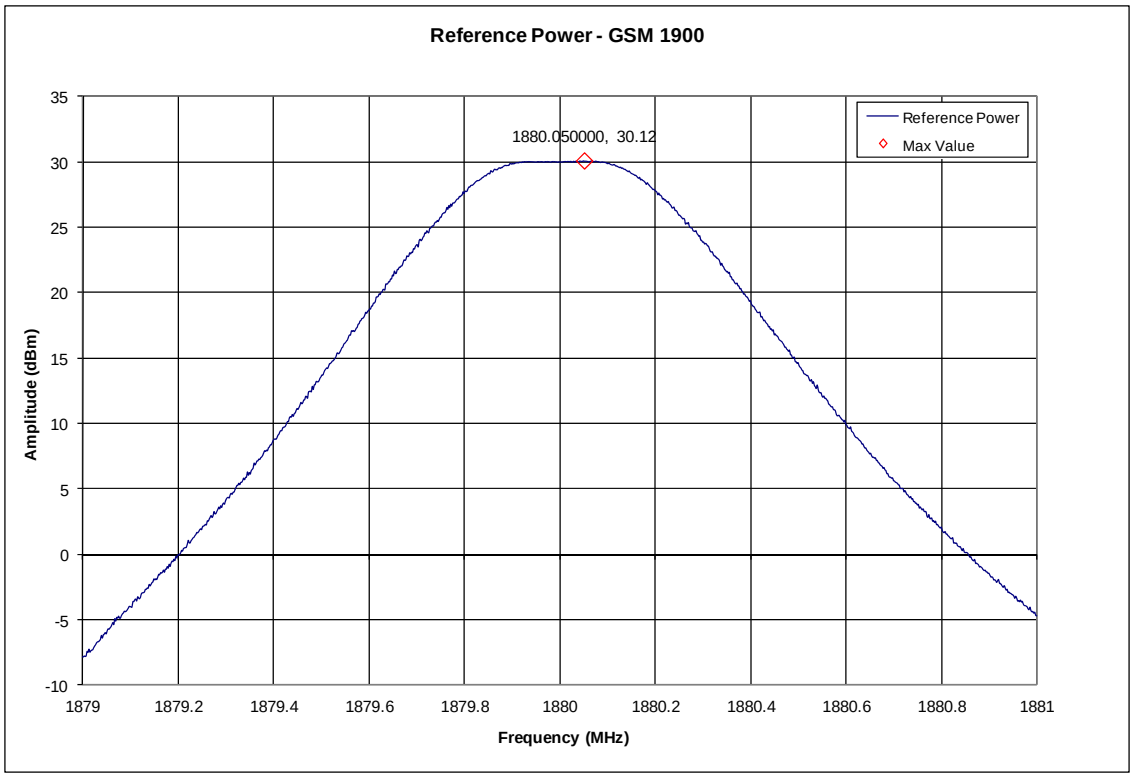



**EDGE 850 – Lower Band Edge – Channel 128 (824.2 MHz)**

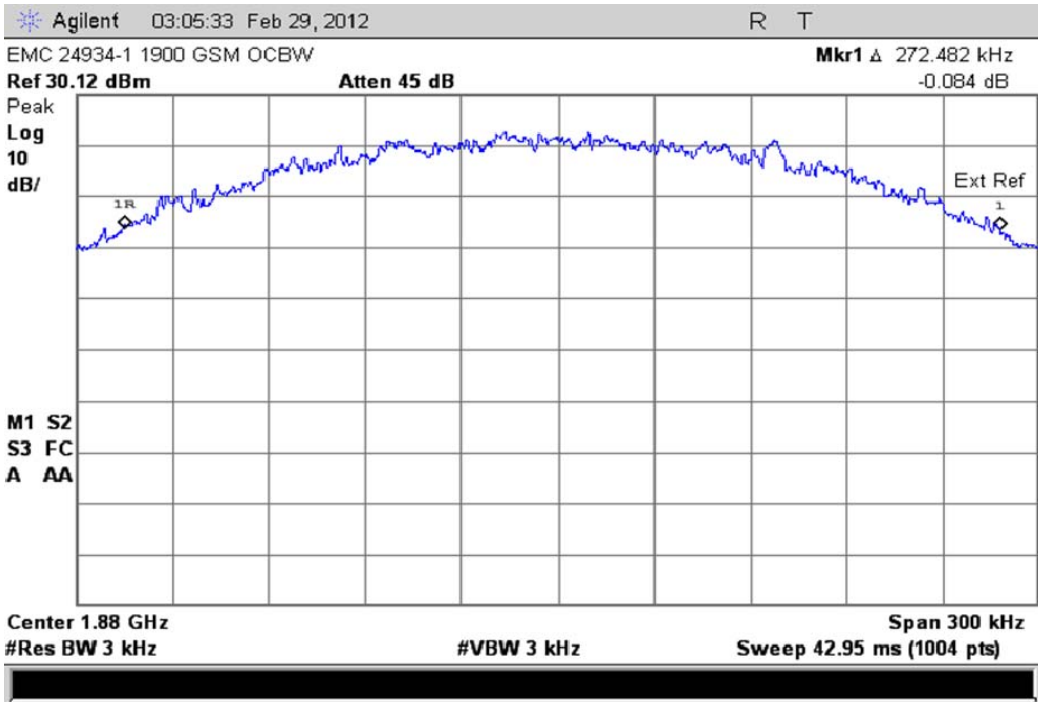



**EDGE 850 – Upper Band Edge – Channel 251 (848.8 MHz)**

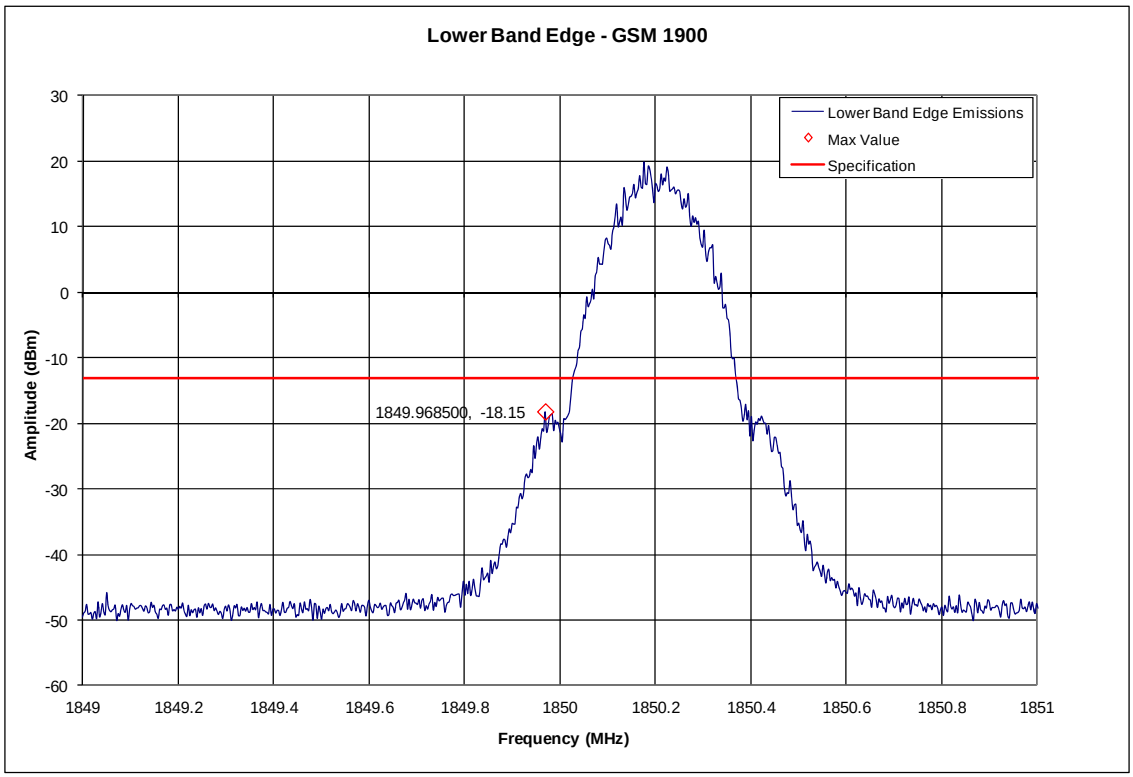
## Measurement Results – GSM 1900



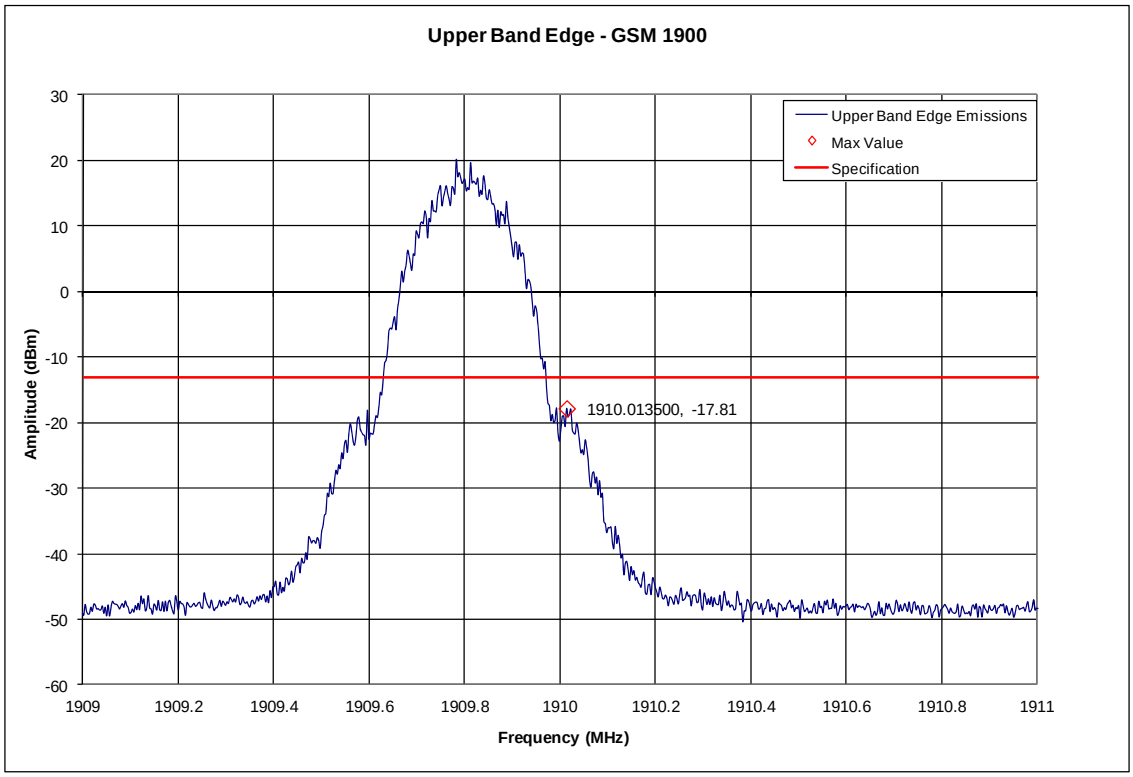

**GSM 1900 – Reference Level Plot – Channel 661 (1880.00MHz)**




**GSM 1900 – Occupied Bandwidth – Channel 661 (1880.00MHz)**

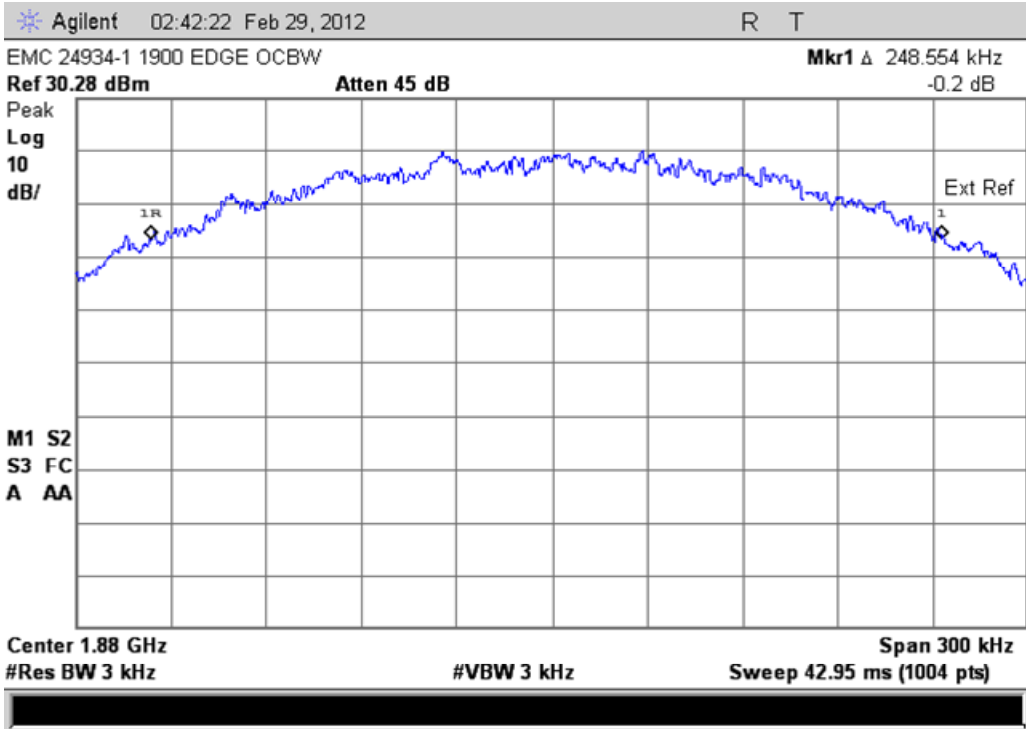



**GSM 1900 – Lower Band Edge – Channel 512 (1850.2MHz)**

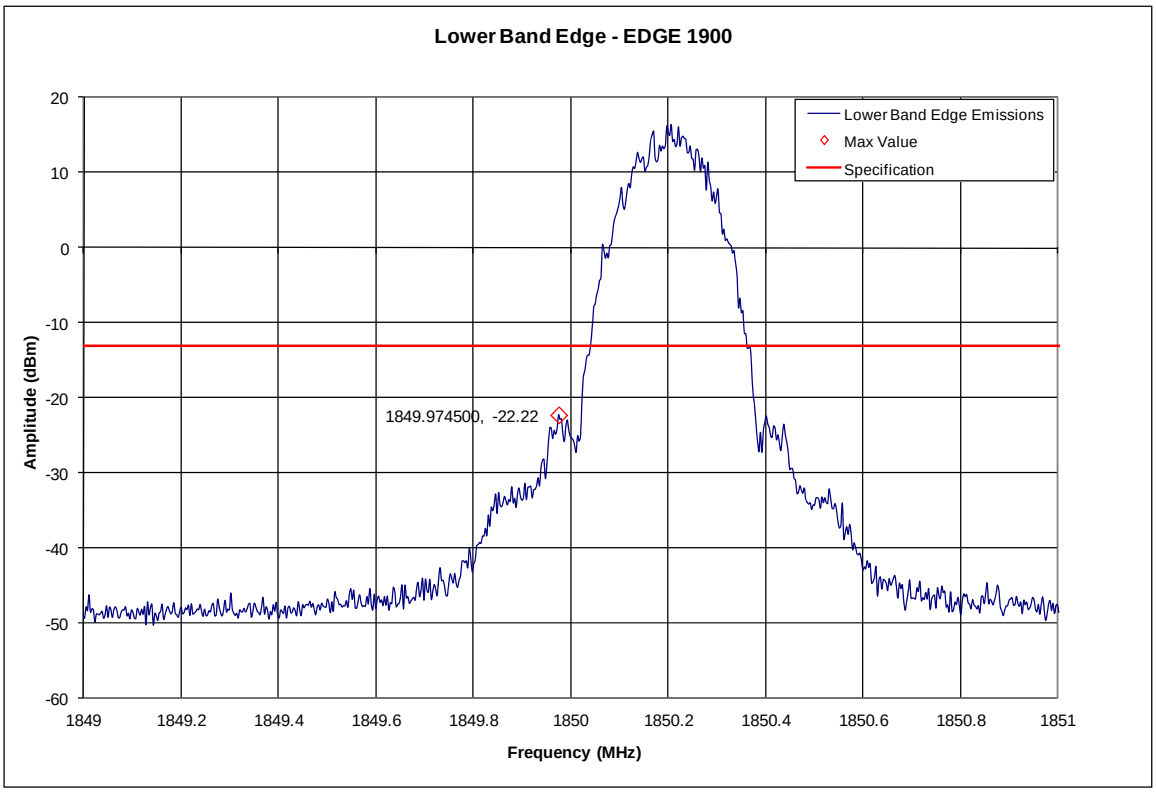



**GSM 1900 – Upper Band Edge – Channel 810 (1909.8MHz)**

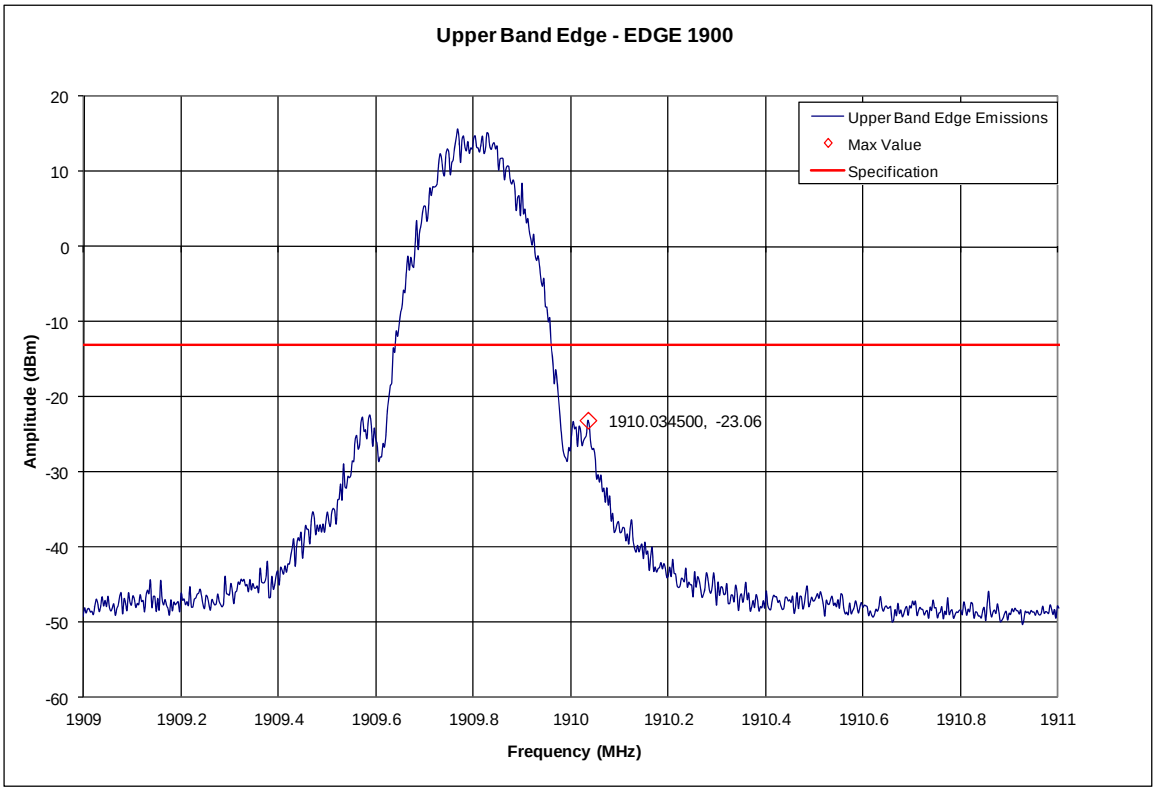
**Measurement Results – EDGE 1900**




**GSM 1900 EDGE – Occupied Bandwidth – Channel 661 (1880.00MHz)**

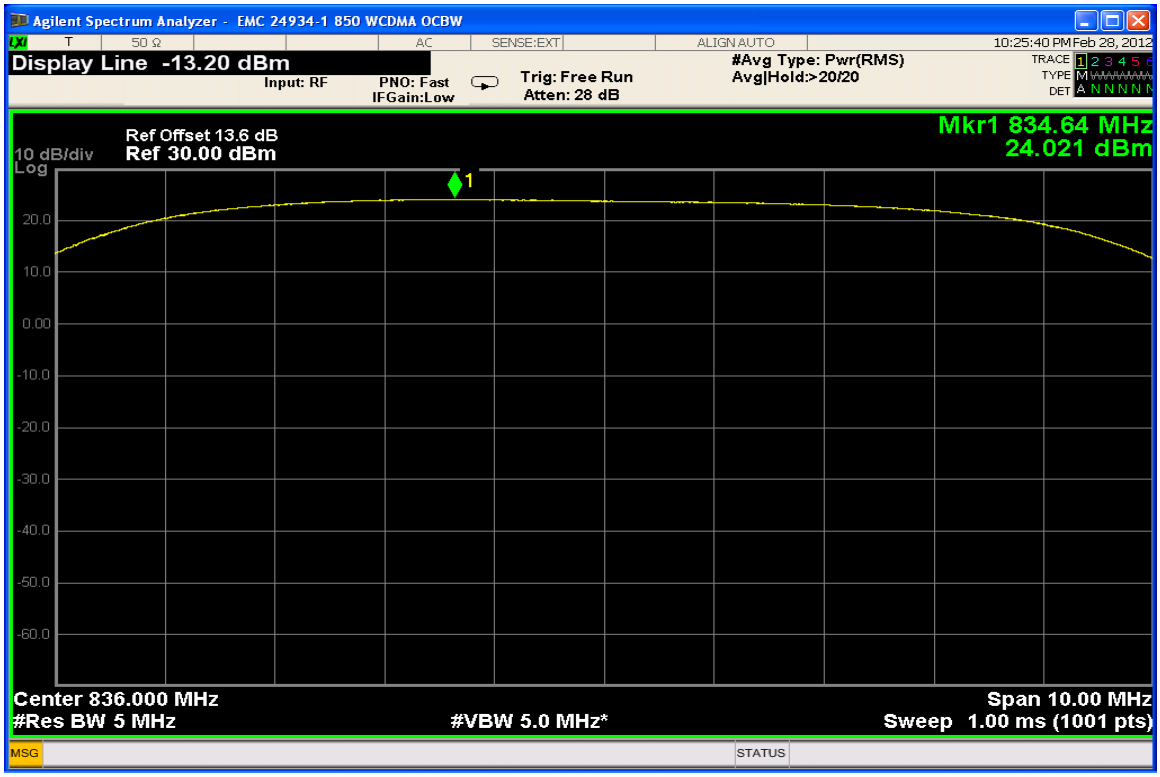



**GSM 1900 EDGE – Lower Band Edge – Channel 512 (1850.2MHz)**

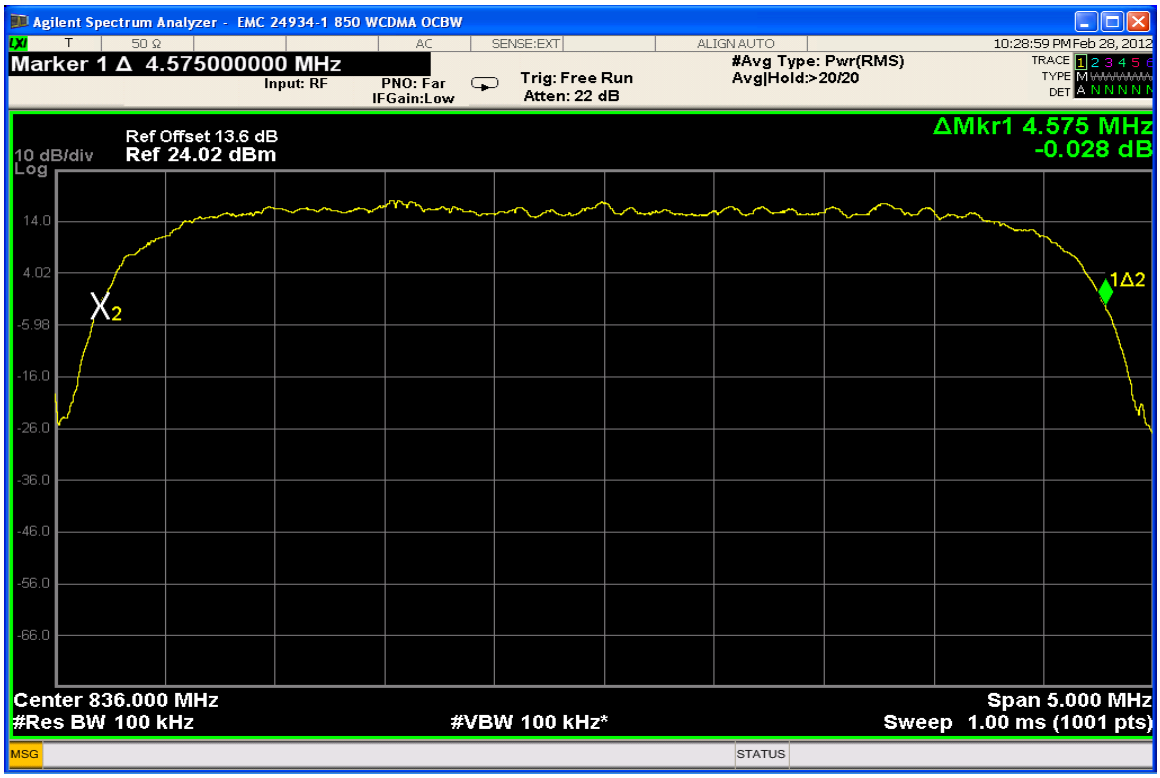



**GSM 1900 EDGE – Upper Band Edge – Channel 810 (1909.8MHz)**

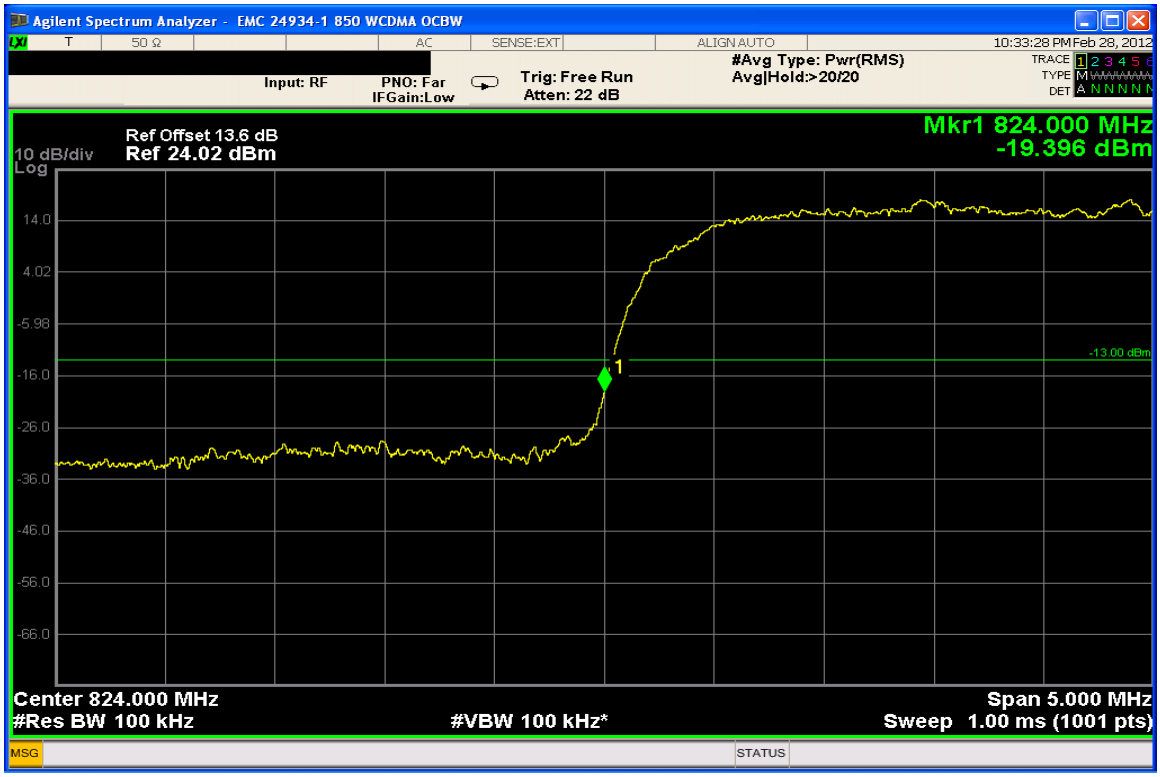
## Measurement Results – WCDMA 850




**WCDMA 850 – Reference Level Plot – Channel 4180 (836.0 MHz)**



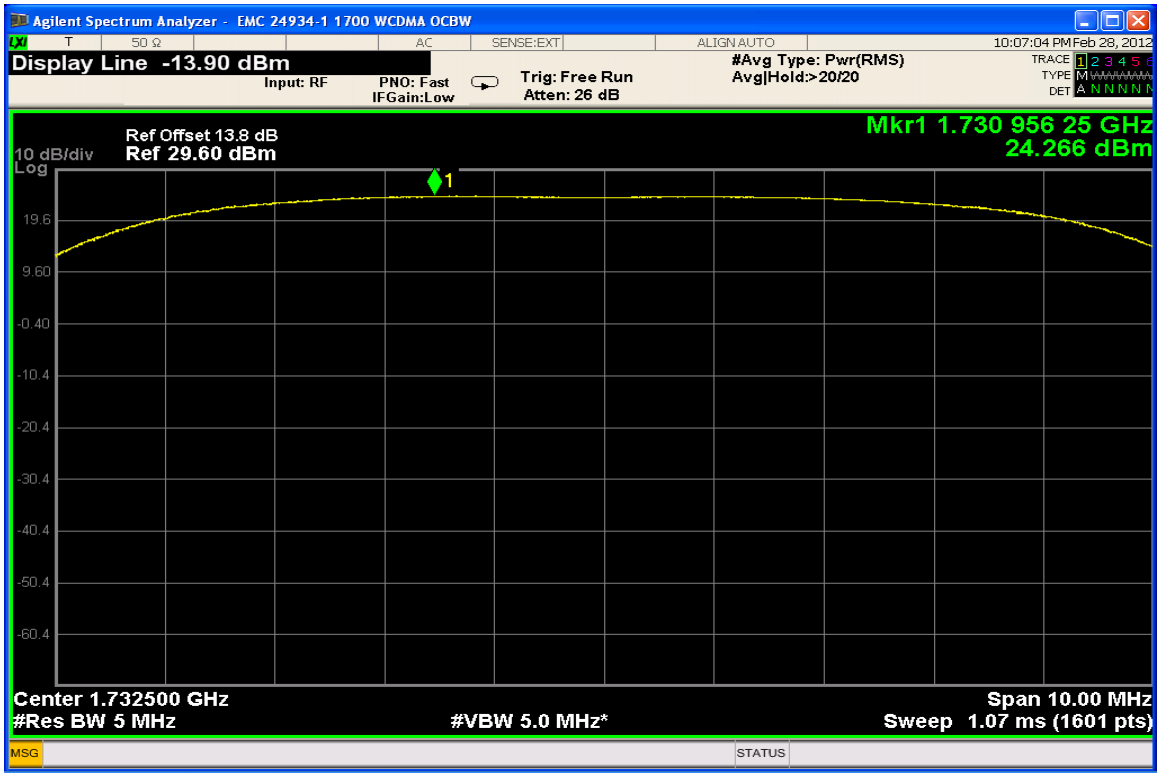

**WCDMA 850 – Occupied Bandwidth – Channel 4180 (836.0 MHz)**



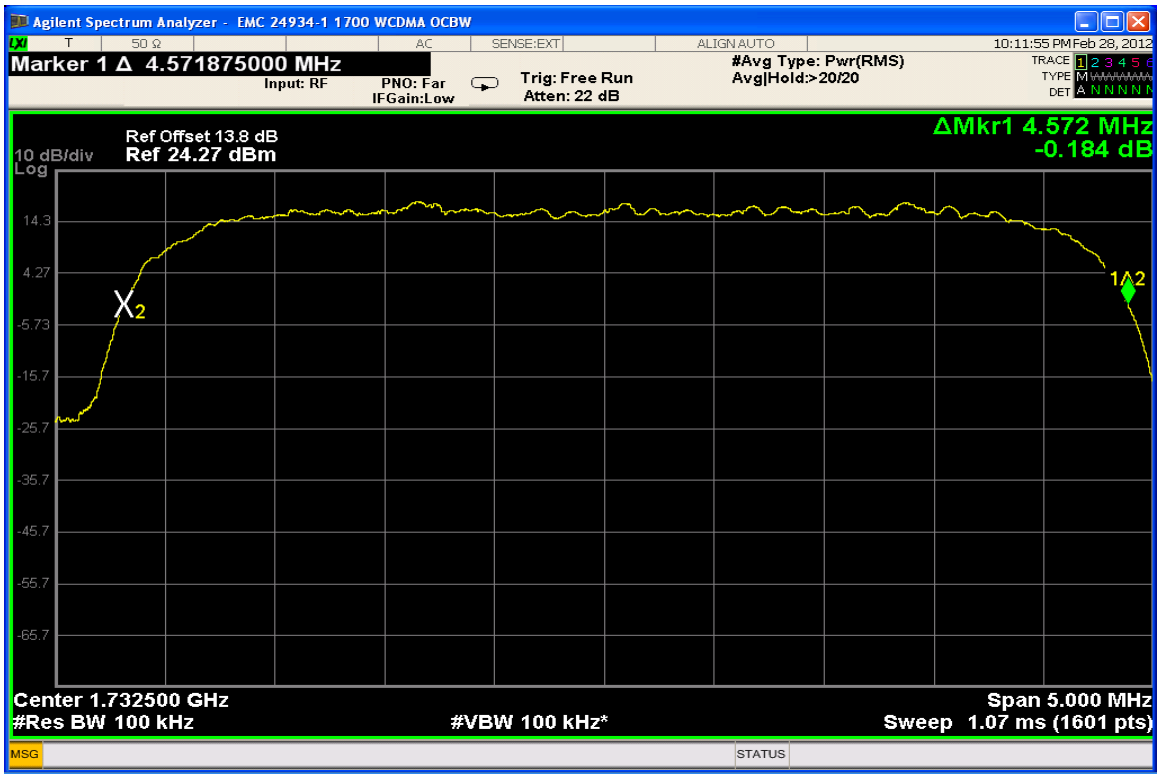

**WCDMA 850 – Lower Band Edge – Channel 4132 (826.4 MHz)**

**WCDMA 850 – Upper Band Edge – Channel 4233 (846.6 MHz)**

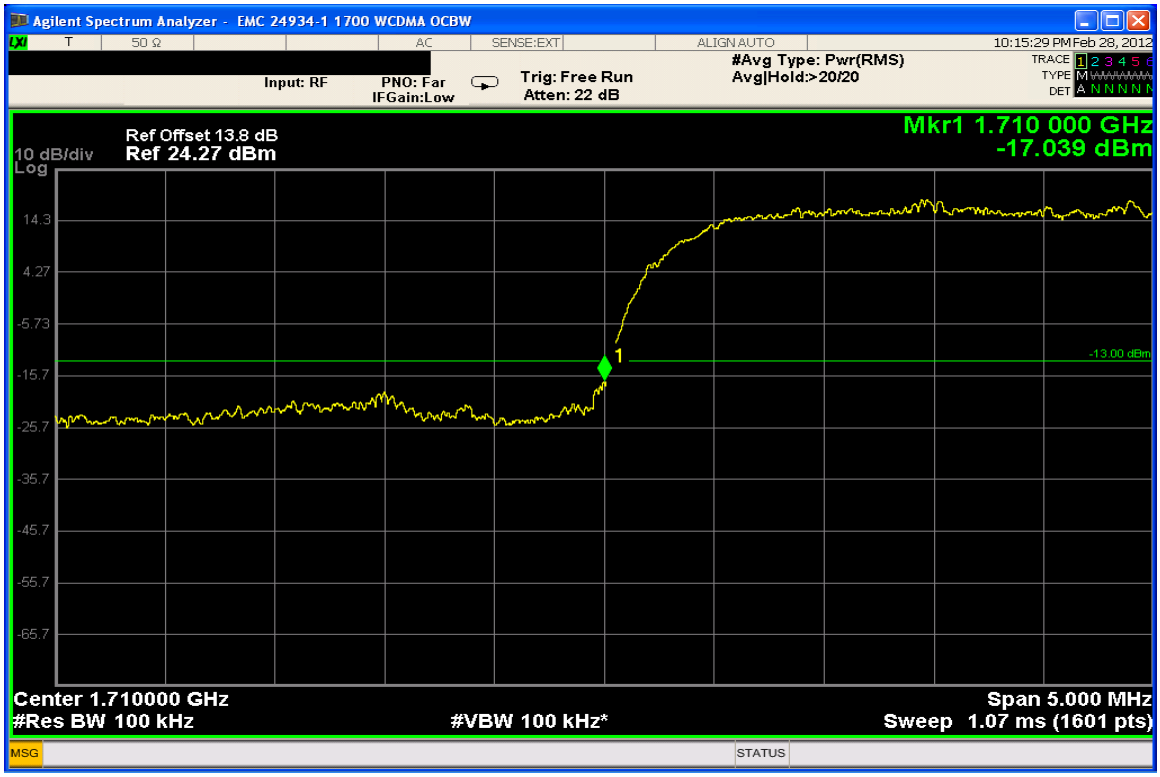
## Measurement Results – WCDMA 1700




**WCDMA 1700 – Reference Level Plot – Channel 1413 (1732.5 MHz)**



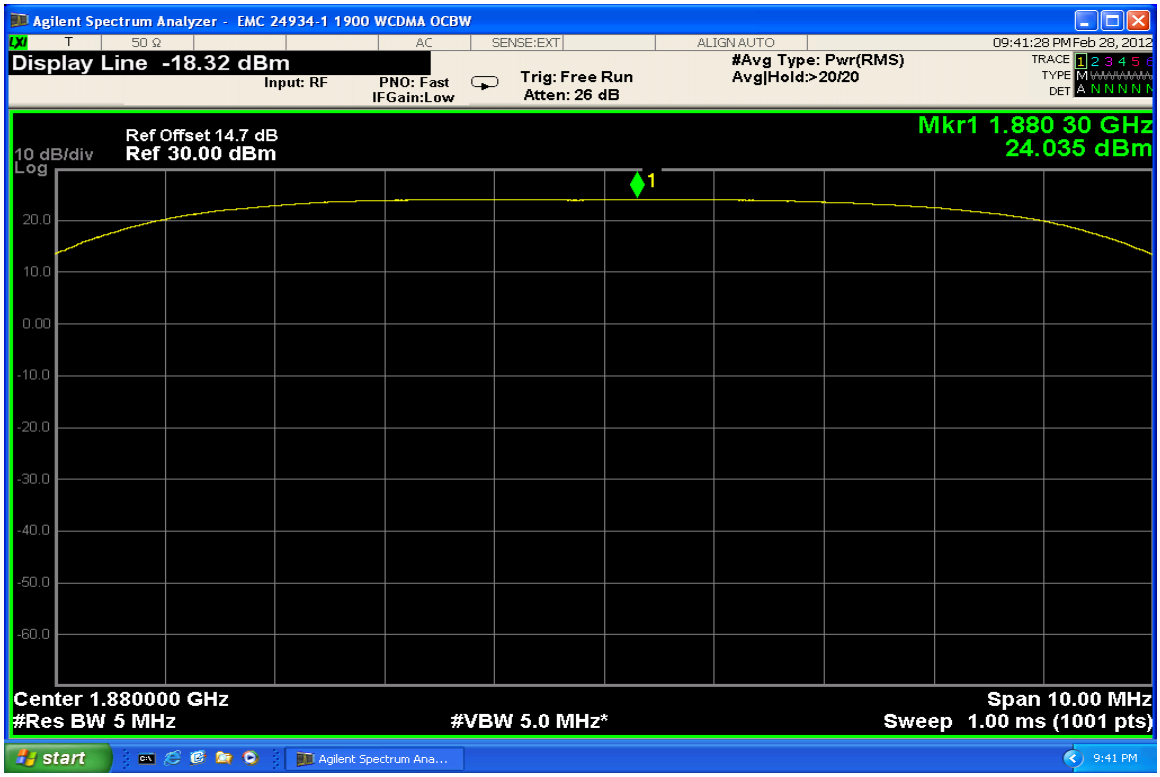

**WCDMA 1700 – Occupied Bandwidth – Channel 1413 (1732.5 MHz)**



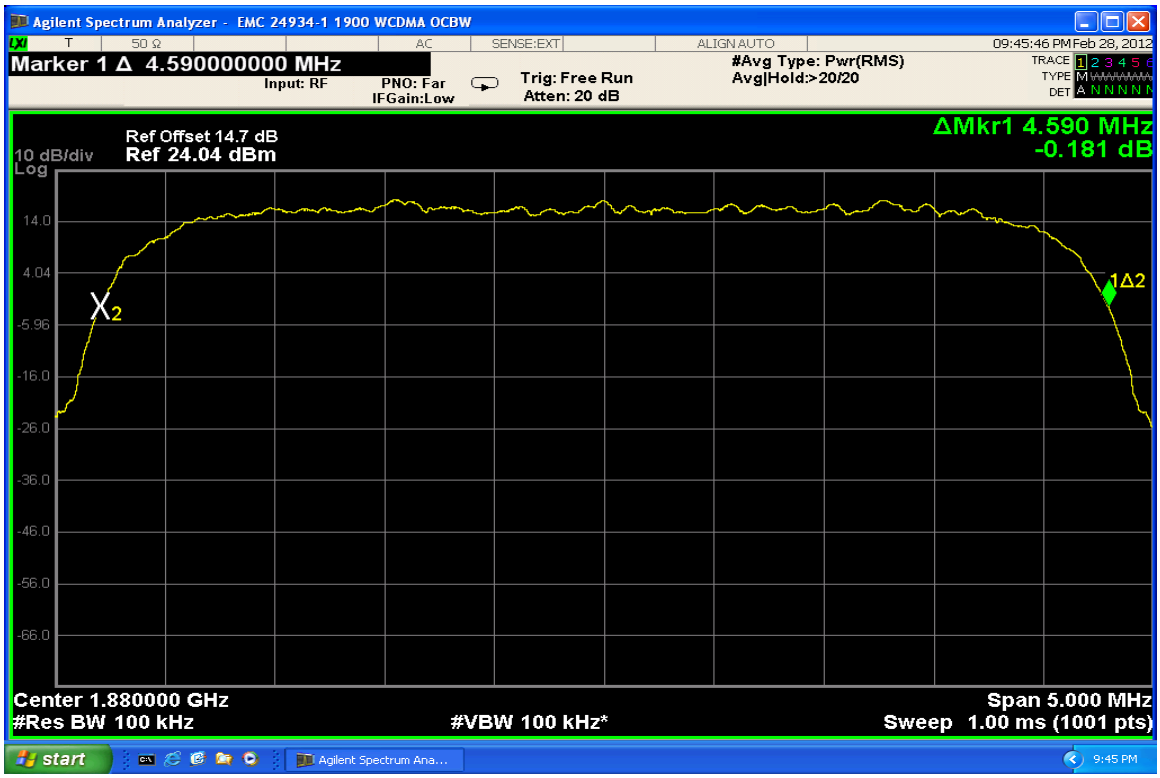

**WCDMA 1700 – Lower Band Edge – Channel 1312 (1712.4 MHz)**

**WCDMA 1700 – Upper Band Edge – Channel 1513 (1752.6 MHz)**

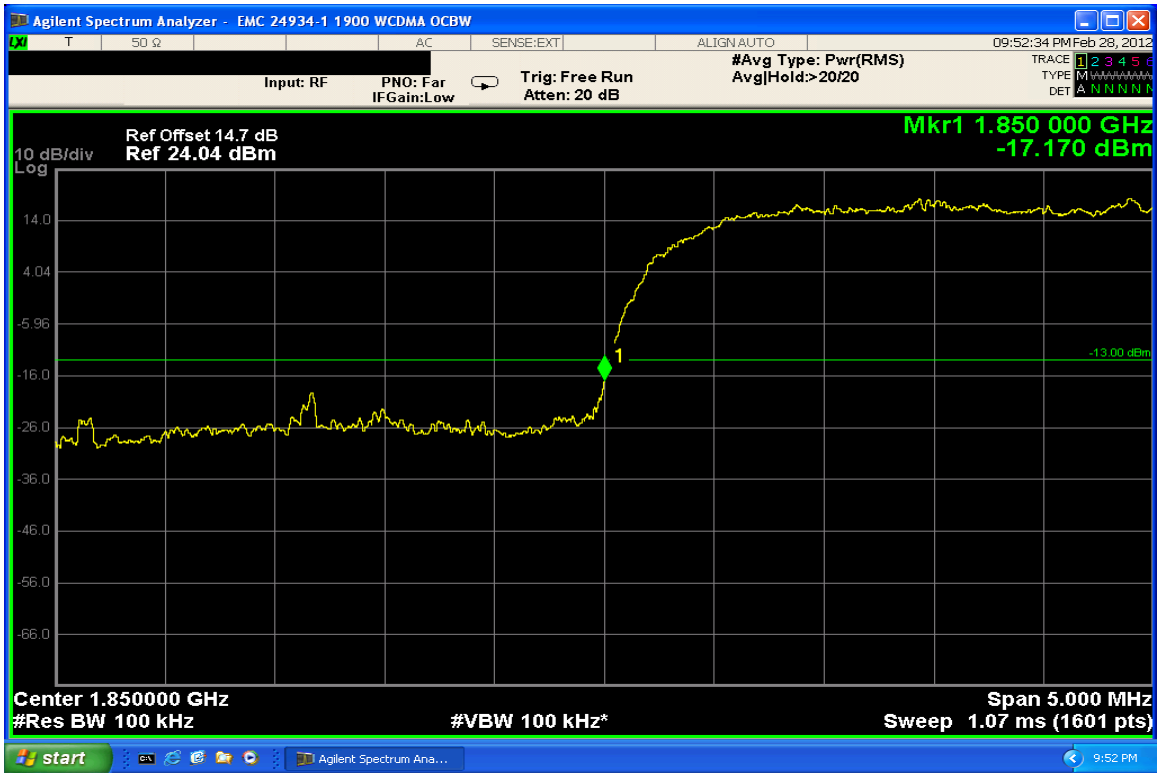
## Measurement Results – WCDMA 1900




**WCDMA 1900 – Reference Level Plot – Channel 9400 (1880.00 MHz)**




**WCDMA 1900 – Occupied Bandwidth – Channel 9400 (1880.00 MHz)**




**WCDMA 1900 – Lower Band Edge – Channel 9262 (1852.40 MHz)**

**WCDMA 1900 – Upper Band Edge – Channel 9538 (1907.60 MHz)**

# SPURIOUS EMISSIONS AT ANTENNA TERMINALS

## Measurement Procedure

The RF output port of the EUT is directly coupled to the input of the EMC analyzer through a specialized RF connector and a 10dB passive attenuator. A fully charged battery was used for the supply voltage.

The spectrum was investigated from the lowest frequency signal generated, without going below 9 kHz, up to at least the tenth harmonic of the fundamental or 40 GHz, whichever is lower.

The spectrum analyzer settings were as follows:

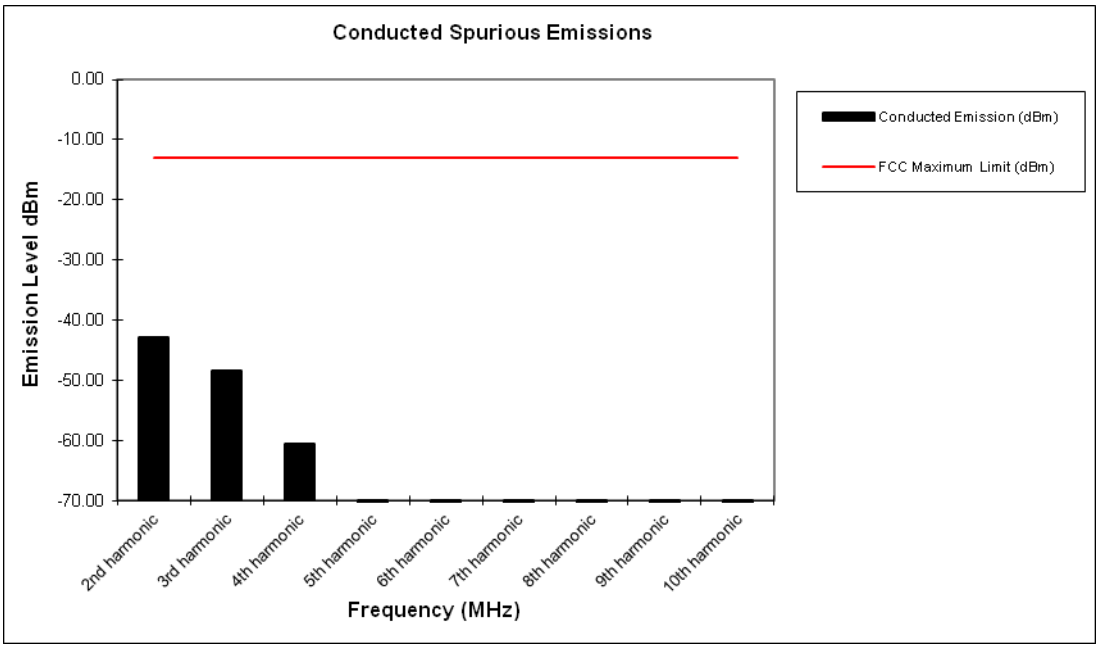
| | |
|---|---|
| Units | dBm |
| Divisions | 10 dB |
| Detector | Peak Detector |
| Resolution Bandwidth | 1 MHz |
| Video Bandwidth (AVG) | Auto |
| Sweep Time | Auto |

## Measurement Results

Attached

**Measurement Results**
**Modulation: GSM 850**

| Harmonic of Fundamental | FCC Maximum Limit (dBm) | Conducted Emission (dBm) |
|---|---|---|
| 2nd harmonic | -13 | -42.90 |
| 3rd harmonic | -13 | -48.52 |
| 4th harmonic | -13 | -60.58 |
| 5th harmonic | -13 | * |
| 6th harmonic | -13 | * |
| 7th harmonic | -13 | * |
| 8th harmonic | -13 | * |
| 9th harmonic | -13 | * |
| 10th harmonic | -13 | * |

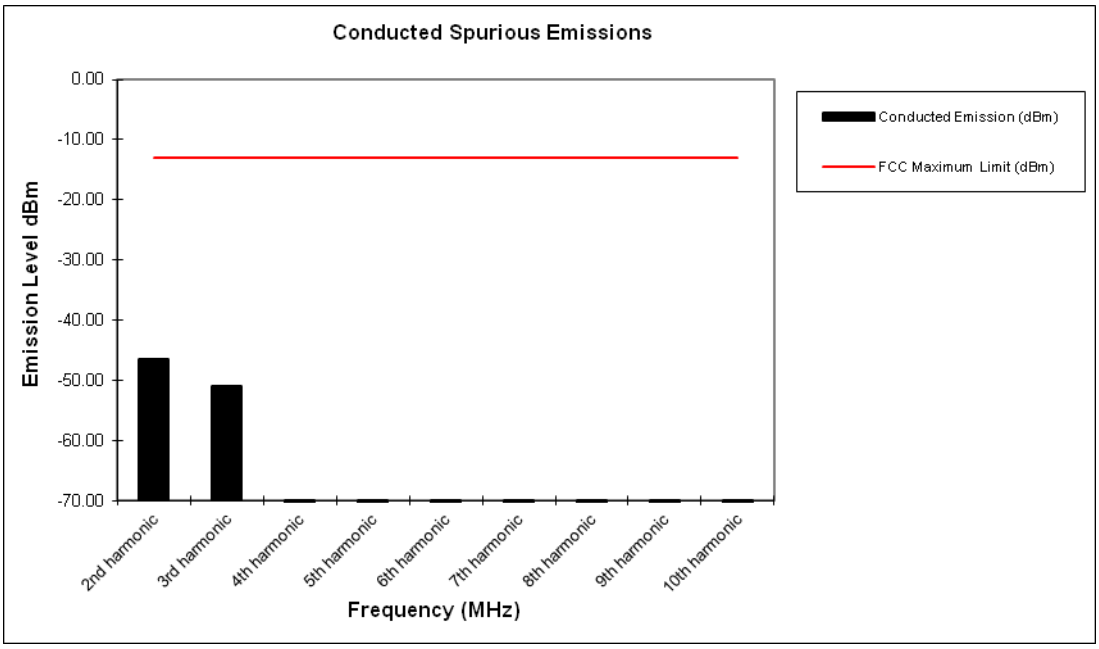



Notes:
1. * Indicates the spurious emission could not be detected due to noise limitations or ambients.
2. Each emission reported reflects the highest absolute level at the specific harmonic for the low, mid, and high channels at maximum power.
3. The Spectrum was investigated from 9 kHz to the tenth harmonic of the fundamental.

The margin with respect to the limit is the minimum margin for all modes and bands.

**Measurement Results**
**Modulation: EDGE 850**

| Harmonic of Fundamental | FCC Maximum Limit (dBm) | Conducted Emission (dBm) |
|---|---|---|
| 2nd harmonic | -13 | -46.54 |
| 3rd harmonic | -13 | -50.97 |
| 4th harmonic | -13 | * |
| 5th harmonic | -13 | * |
| 6th harmonic | -13 | * |
| 7th harmonic | -13 | * |
| 8th harmonic | -13 | * |
| 9th harmonic | -13 | * |
| 10th harmonic | -13 | * |

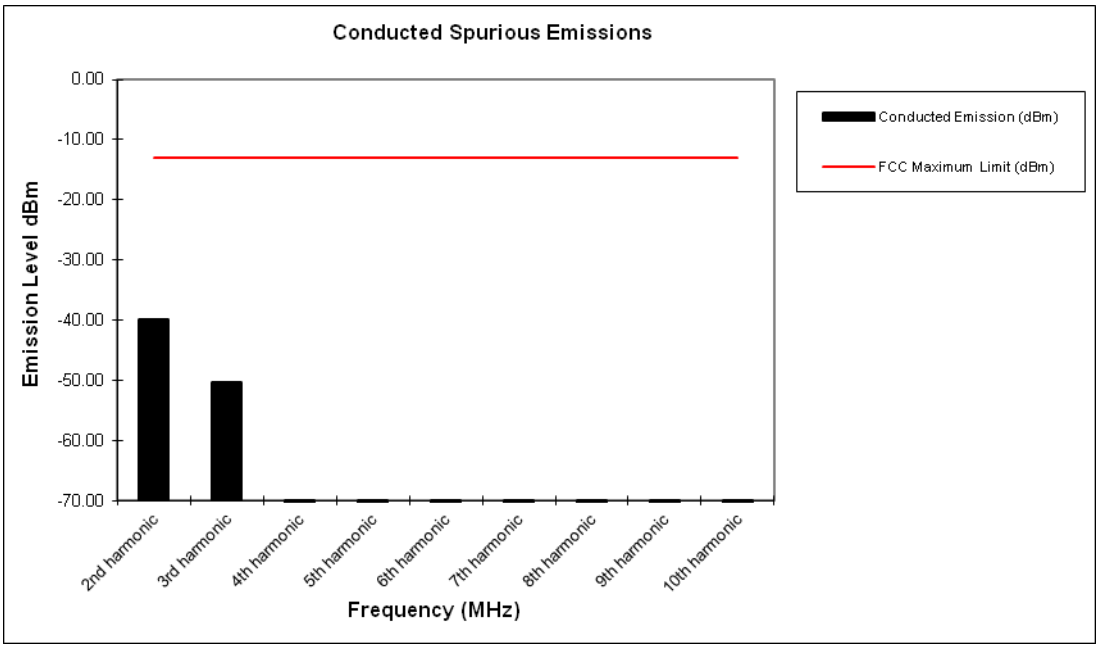



Notes:
1. * Indicates the spurious emission could not be detected due to noise limitations or ambients.
2. Each emission reported reflects the highest absolute level at the specific harmonic for the low, mid, and high channels at maximum power.
3. The Spectrum was investigated from 9 kHz to the tenth harmonic of the fundamental.

The margin with respect to the limit is the minimum margin for all modes and bands.

**Measurement Results**
**Modulation: GSM 1900**

| Harmonic of Fundamental | FCC Maximum Limit (dBm) | Conducted Emission (dBm) |
|---|---|---|
| 2nd harmonic | -13 | -39.91 |
| 3rd harmonic | -13 | -50.24 |
| 4th harmonic | -13 | * |
| 5th harmonic | -13 | * |
| 6th harmonic | -13 | * |
| 7th harmonic | -13 | * |
| 8th harmonic | -13 | * |
| 9th harmonic | -13 | * |
| 10th harmonic | -13 | * |

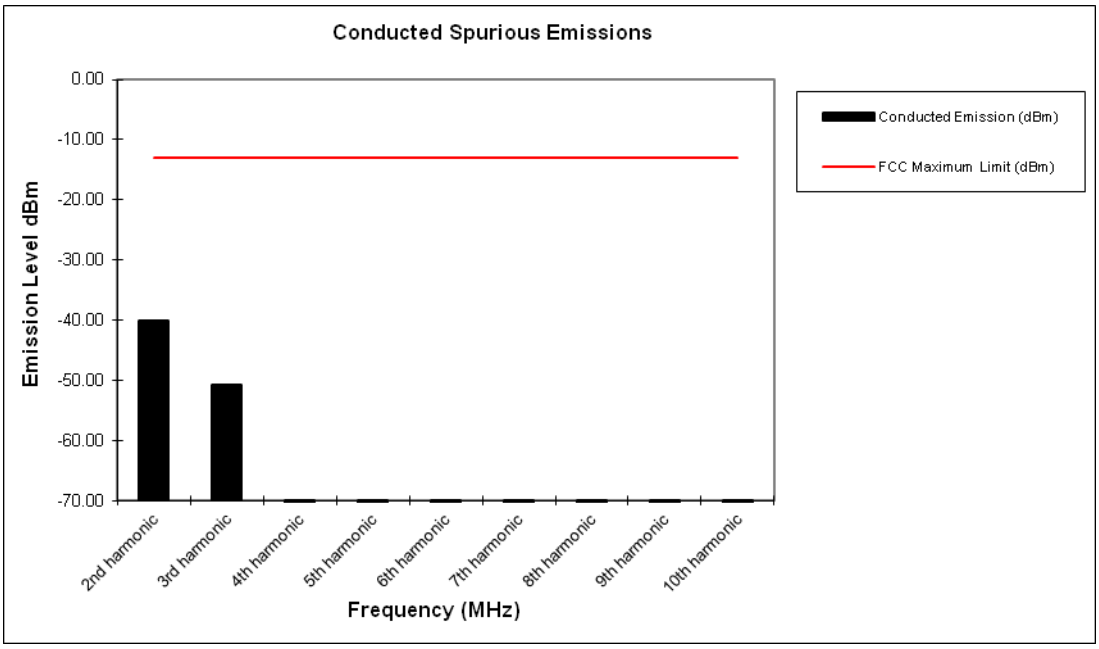



Notes:
1. * Indicates the spurious emission could not be detected due to noise limitations or ambients.
2. Each emission reported reflects the highest absolute level at the specific harmonic for the low, mid, and high channels at maximum power.
3. The Spectrum was investigated from 9 kHz to the tenth harmonic of the fundamental.

The margin with respect to the limit is the minimum margin for all modes and bands.

**Measurement Results**
**Modulation: EDGE 1900**

| Harmonic of Fundamental | FCC Maximum Limit (dBm) | Conducted Emission (dBm) |
|---|---|---|
| 2nd harmonic | -13 | -40.01 |
| 3rd harmonic | -13 | -50.78 |
| 4th harmonic | -13 | * |
| 5th harmonic | -13 | * |
| 6th harmonic | -13 | * |
| 7th harmonic | -13 | * |
| 8th harmonic | -13 | * |
| 9th harmonic | -13 | * |
| 10th harmonic | -13 | * |

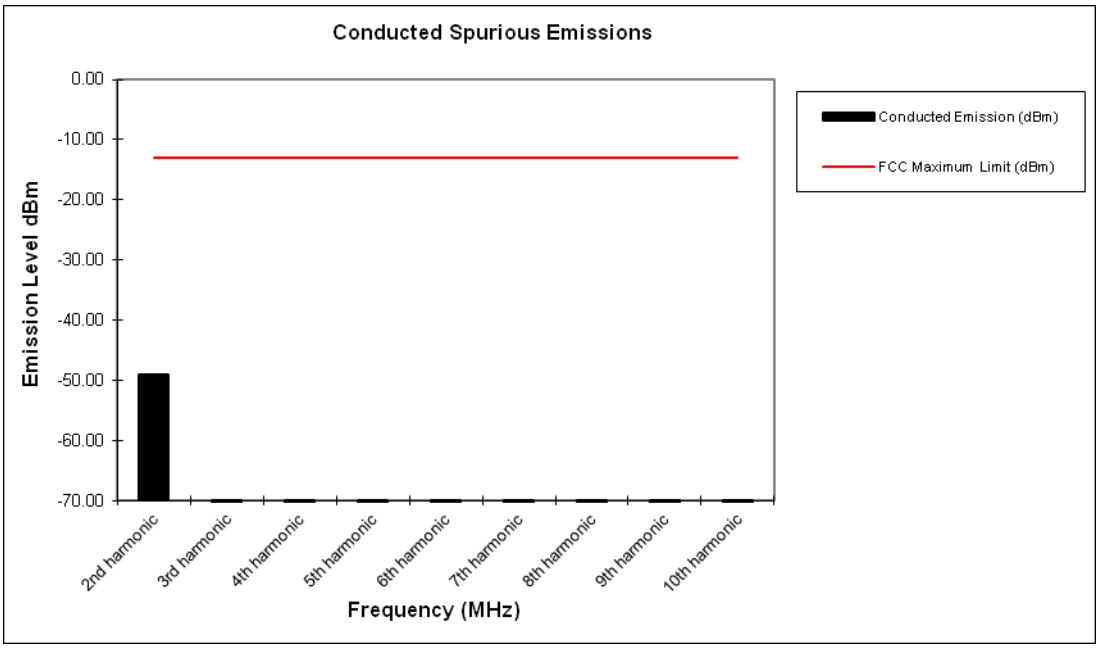



Notes:
1. * Indicates the spurious emission could not be detected due to noise limitations or ambients.
2. Each emission reported reflects the highest absolute level at the specific harmonic for the low, mid, and high channels at maximum power.
3. The Spectrum was investigated from 9 kHz to the tenth harmonic of the fundamental.

The margin with respect to the limit is the minimum margin for all modes and bands.

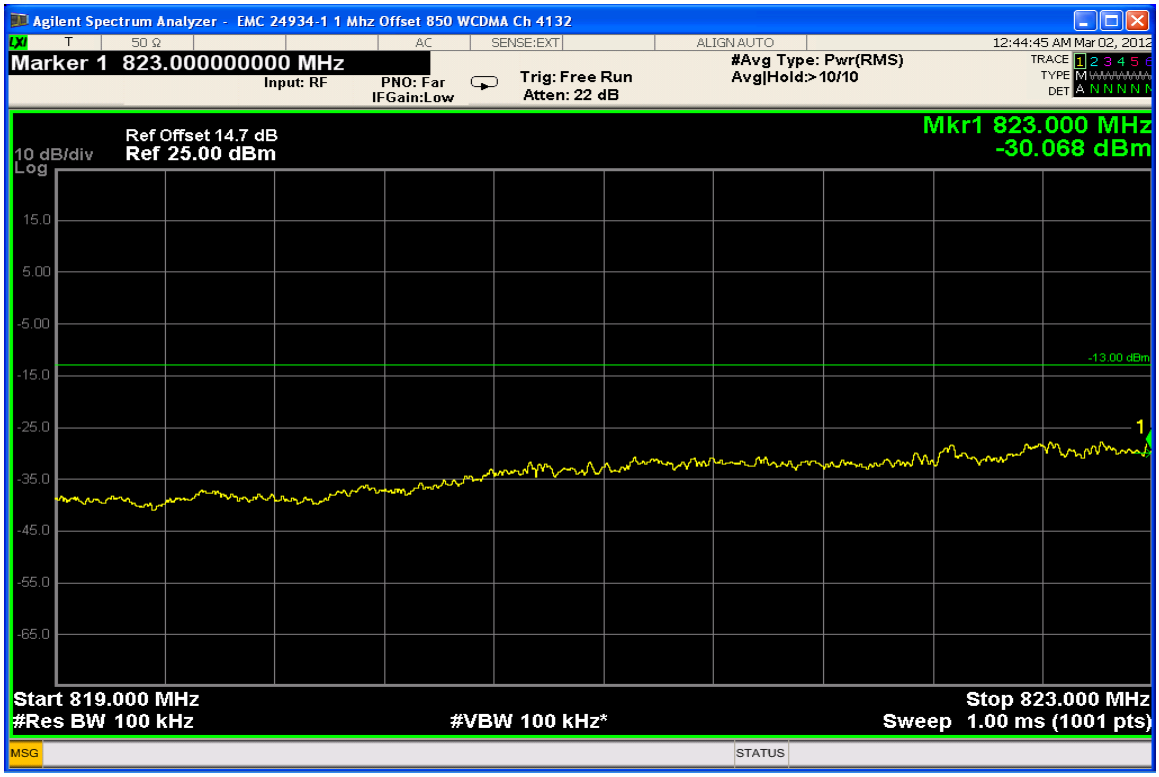
**Measurement Results**
**Modulation: WCDMA 850**

| Harmonic of Fundamental | FCC Maximum Limit (dBm) | Conducted Emission (dBm) |
|---|---|---|
| 2nd harmonic | -13 | -49.01 |
| 3rd harmonic | -13 | * |
| 4th harmonic | -13 | * |
| 5th harmonic | -13 | * |
| 6th harmonic | -13 | * |
| 7th harmonic | -13 | * |
| 8th harmonic | -13 | * |
| 9th harmonic | -13 | * |
| 10th harmonic | -13 | * |

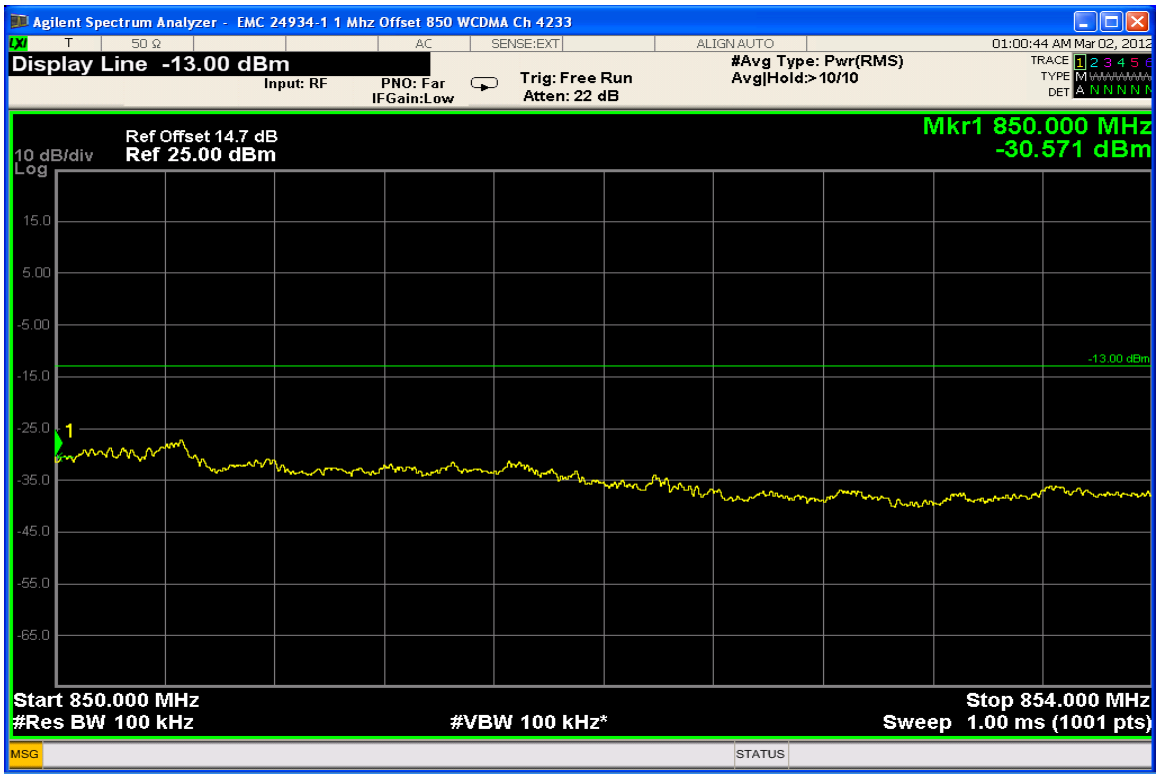



Notes:
1. * Indicates the spurious emission could not be detected due to noise limitations or ambients.
2. Each emission reported reflects the highest absolute level at the specific harmonic for the low, mid, and high channels at maximum power.
3. The Spectrum was investigated from 9 kHz to the tenth harmonic of the fundamental.

The margin with respect to the limit is the minimum margin for all modes and bands.



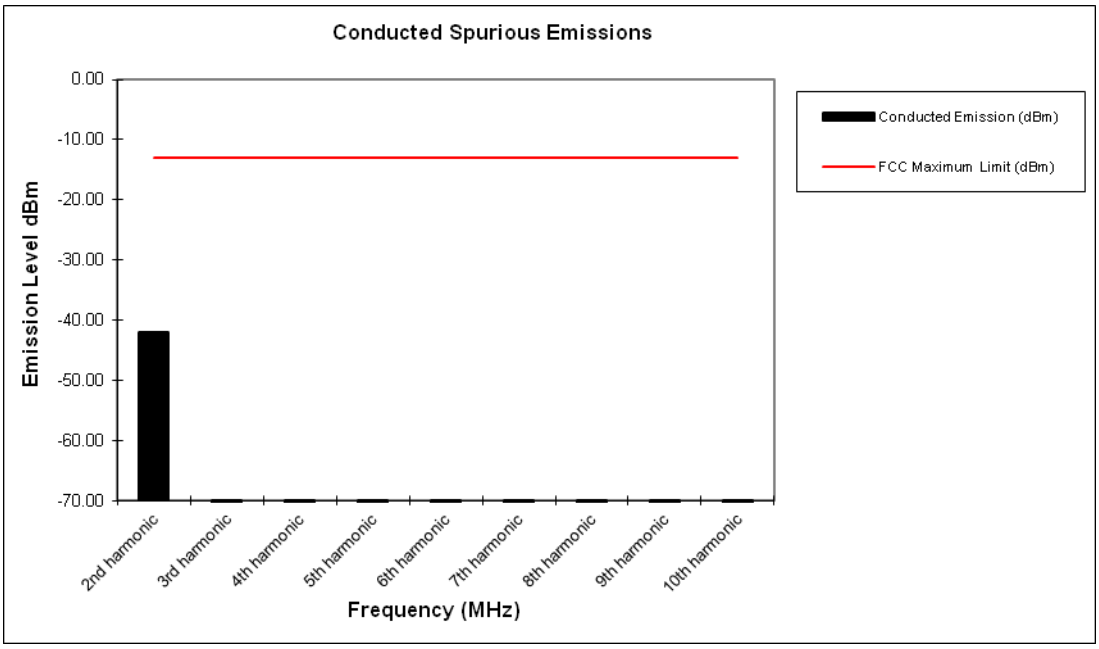

**850 WCDMA Conducted Spurious Emissions (Lower adjacent 1 MHz band)**




**850 WCDMA Conducted Spurious Emissions (Upper adjacent 1 MHz band)**

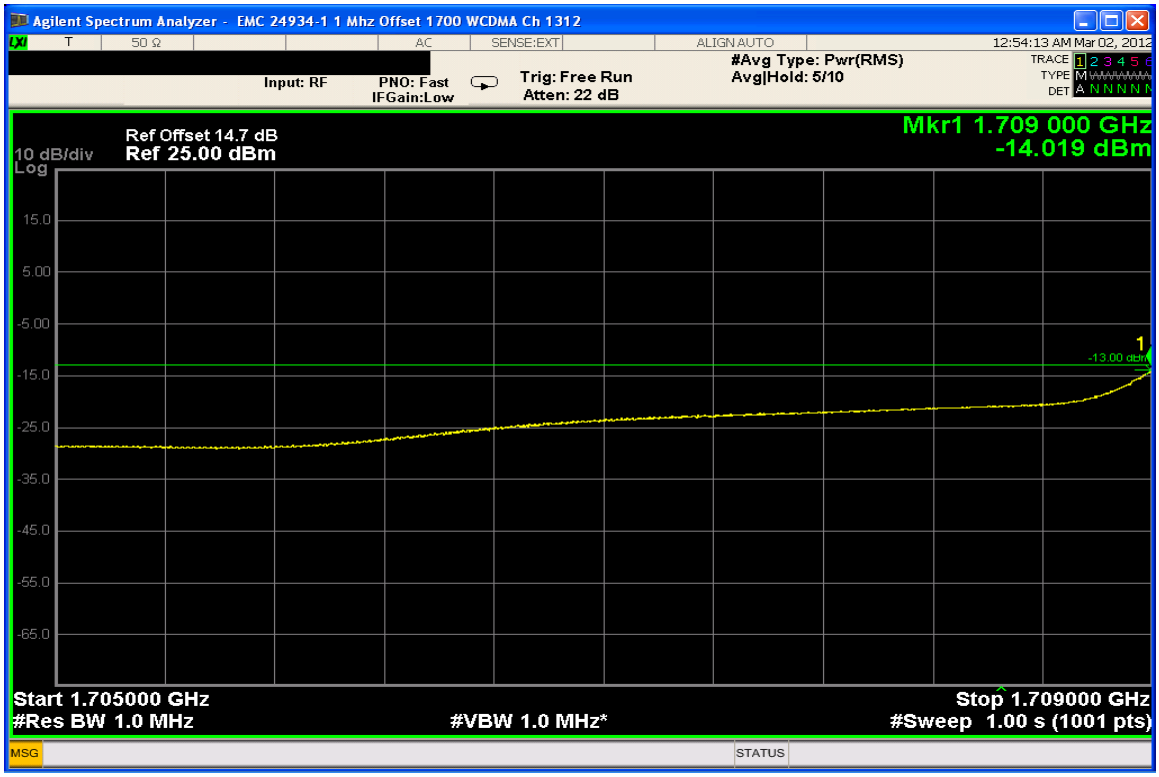
**Measurement Results**
**Modulation: WCDMA 1700**

| Harmonic of Fundamental | FCC Maximum Limit (dBm) | Conducted Emission (dBm) |
|---|---|---|
| 2nd harmonic | -13 | -42.11 |
| 3rd harmonic | -13 | * |
| 4th harmonic | -13 | * |
| 5th harmonic | -13 | * |
| 6th harmonic | -13 | * |
| 7th harmonic | -13 | * |
| 8th harmonic | -13 | * |
| 9th harmonic | -13 | * |
| 10th harmonic | -13 | * |

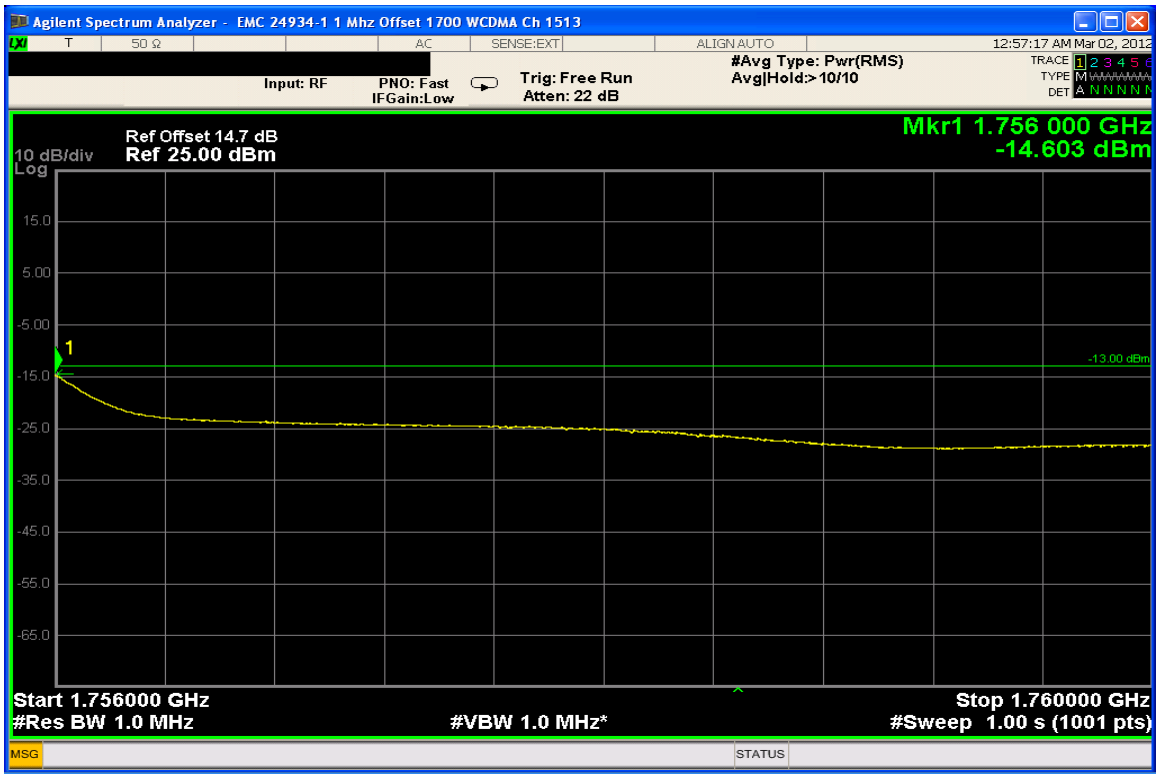



Notes:
1. * Indicates the spurious emission could not be detected due to noise limitations or ambients.
2. Each emission reported reflects the highest absolute level at the specific harmonic for the low, mid, and high channels at maximum power.
3. The Spectrum was investigated from 9 kHz to the tenth harmonic of the fundamental.

The margin with respect to the limit is the minimum margin for all modes and bands.



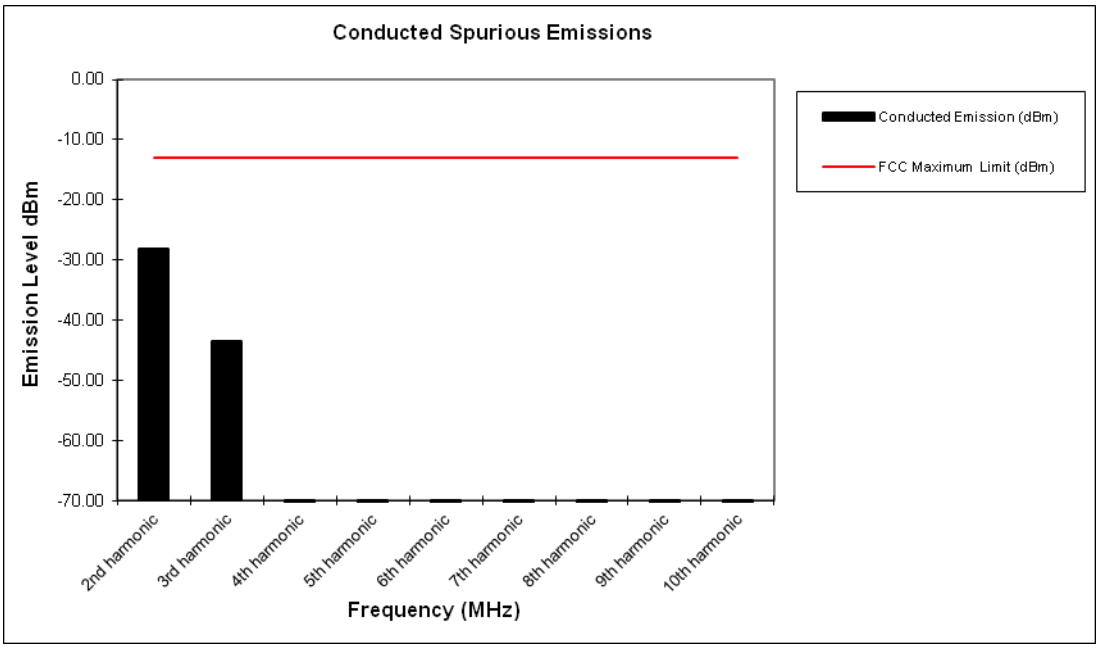

**1700 WCDMA Conducted Spurious Emissions (Lower adjacent 1 MHz band)**




**1700 WCDMA Conducted Spurious Emissions (Upper adjacent 1 MHz band)**

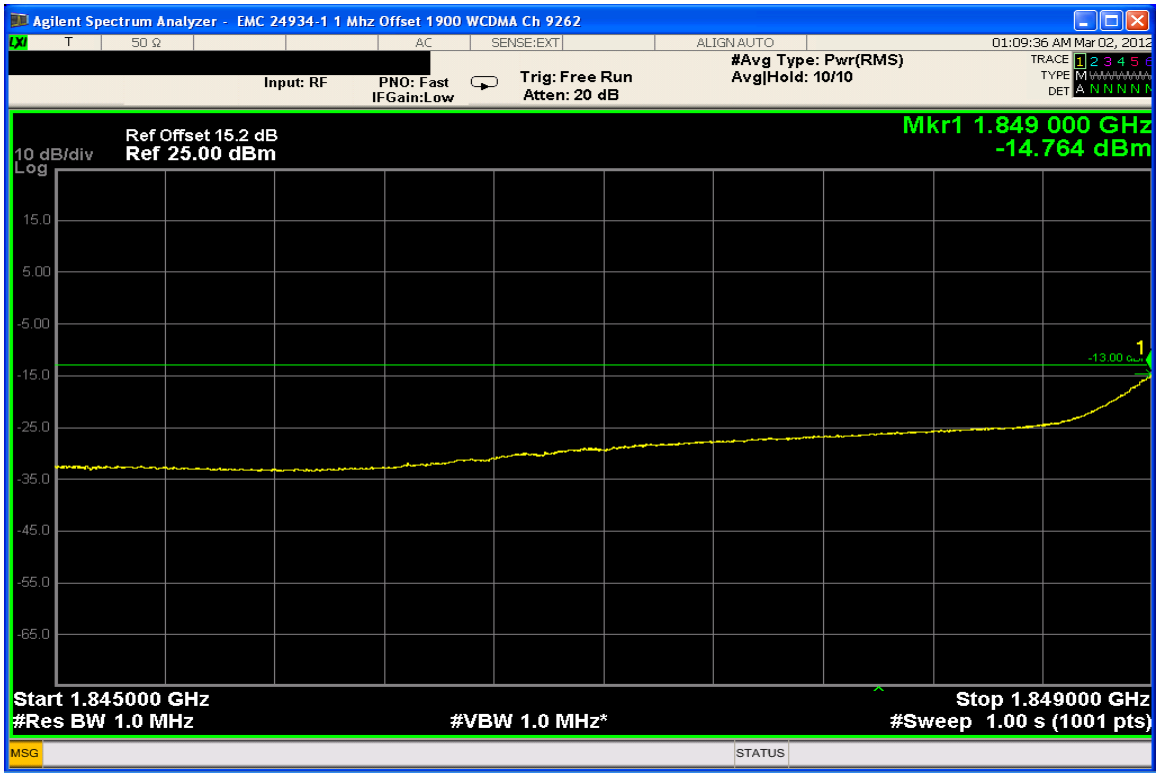
**Measurement Results**
**Modulation: WCDMA 1900**

| Harmonic of Fundamental | FCC Maximum Limit (dBm) | Conducted Emission (dBm) |
|---|---|---|
| 2nd harmonic | -13 | -28.25 |
| 3rd harmonic | -13 | -43.51 |
| 4th harmonic | -13 | * |
| 5th harmonic | -13 | * |
| 6th harmonic | -13 | * |
| 7th harmonic | -13 | * |
| 8th harmonic | -13 | * |
| 9th harmonic | -13 | * |
| 10th harmonic | -13 | * |

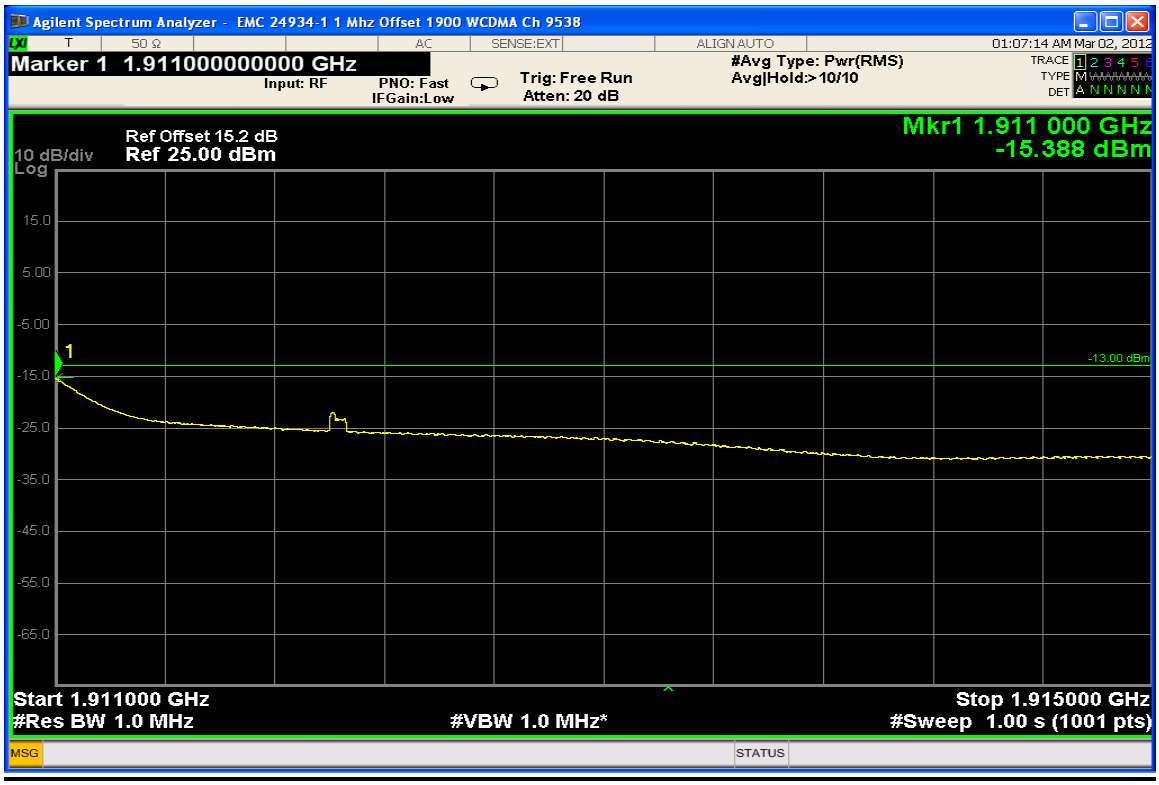



Notes:
1. * Indicates the spurious emission could not be detected due to noise limitations or ambients.
2. Each emission reported reflects the highest absolute level at the specific harmonic for the low, mid, and high channels at maximum power.
3. The Spectrum was investigated from 9 kHz to the tenth harmonic of the fundamental.

The margin with respect to the limit is the minimum margin for all modes and bands.




**1900 WCDMA Conducted Spurious Emissions (Lower adjacent 1 MHz band)**




**1900 WCDMA Conducted Spurious Emissions (Upper adjacent 1 MHz band)**

# FIELD STRENGTH OF SPURIOUS EMISSIONS

## Measurement Procedure

The EUT is placed inside the semi-anechoic chamber on a wooden table at the turntable center. For each spurious frequency, the antenna mast is raised and lowered from 1 to 4 meters and the turntable is rotated 360 degrees to obtain a maximum reading on the spectrum analyzer. This is repeated for both horizontal and vertical polarizations of the receive antenna.

The EUT is then replaced with a substitution antenna fed by a signal generator. With the signal generator tuned to a particular spurious frequency, the antenna mast is raised and lowered from 1 to 4 meters to obtain a maximum reading at the spectrum analyzer. The output of the signal generator is then adjusted until a reading identical to that obtained with the actual transmitter is achieved.

The power in dBm of each spurious emission is calculated by correcting the signal generator level for cable loss and gain of the substitution antenna referenced to a dipole. A fully charged battery was used for the supply voltage. Testing was performed in three orthogonal planes where the X plane is with the EUT orientated vertically, the Y plane is with the EUT orientated on its side and the Z plane with the EUT laying flat on the table. The worst case emission is reported for each tested mode.

The settings of the receiver were as follows:

| | |
|---|---|
| Units | dBm |
| Divisions | 5 dB |
| Detector | Peak Detector |
| Resolution Bandwidth | 1 MHz |
| Video Bandwidth (AVG) | Auto |
| Sweep Time | Auto |

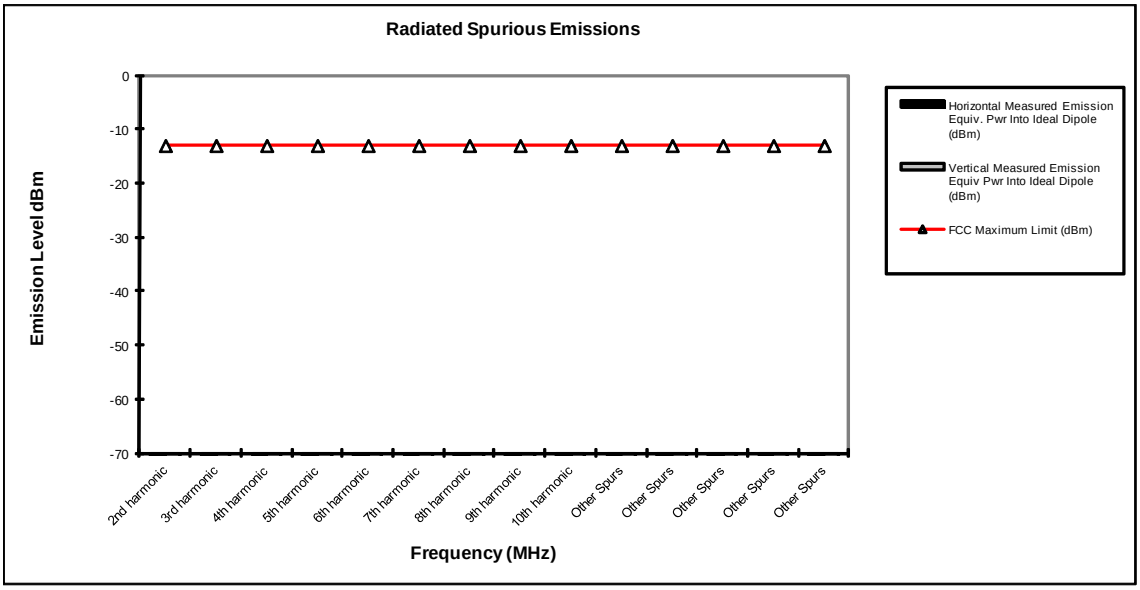
## Measurement Results

Attached

**Measurement Results –**
**GSM 850, EDGE 850, WCDMA 850, WCDMA 1700, WCDMA 1900; all planes**

## Radiated Spurious and Harmonic Emissions

| Frequency (MHz) | FCC Maximum Limit (dBm) | Horizontal Measured Emission Equiv. Pw r Into Ideal Dipole (dBm) | Vertical Measured Emission Equiv Pw r Into Ideal Dipole (dBm) |
|---|---|---|---|
| 2nd harmonic | -13 | * | * |
| 3rd harmonic | -13 | * | * |
| 4th harmonic | -13 | * | * |
| 5th harmonic | -13 | * | * |
| 6th harmonic | -13 | * | * |
| 7th harmonic | -13 | * | * |
| 8th harmonic | -13 | * | * |
| 9th harmonic | -13 | * | * |
| 10th harmonic | -13 | * | * |
| Other Spurs | -13 | * | * |
| Other Spurs | -13 | * | * |
| Other Spurs | -13 | * | * |
| Other Spurs | -13 | * | * |
| Other Spurs | -13 | * | * |



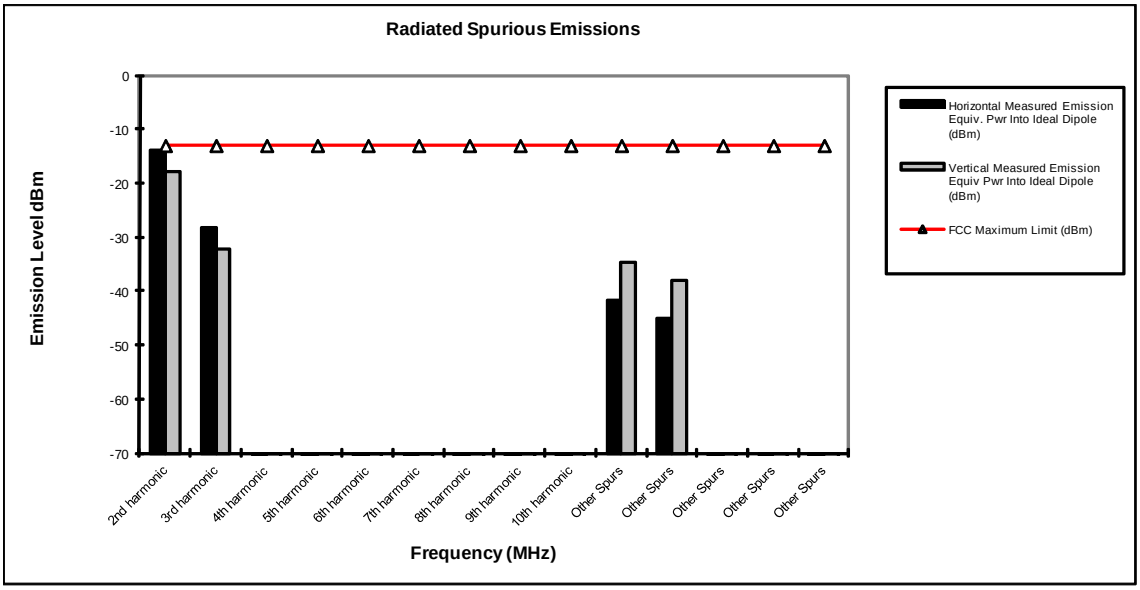

Notes:
1. * Indicates the spurious emission could not be detected due to noise limitations or ambients or the emissions are lower than -33 dBm.
2. Each emission reported reflects the highest absolute level at the specific harmonic for the low, mid, and high channels at maximum power.
3. The Spectrum was investigated from 30 MHz to the tenth harmonic of the fundamental.

The margin with respect to the limit is the minimum margin for all modes and bands.

**Measurement Results –GSM 1900; Y plane**

## Radiated Spurious and Harmonic Emissions

| Frequency (MHz) | FCC Maximum Limit (dBm) | Horizontal Measured Emission Equiv. Pw r Into Ideal Dipole (dBm) | Vertical Measured Emission Equiv Pw r Into Ideal Dipole (dBm) |
|---|---|---|---|
| 2nd harmonic | -13 | -13.9 | -17.7 |
| 3rd harmonic | -13 | -28.3 | -32.2 |
| 4th harmonic | -13 | * | * |
| 5th harmonic | -13 | * | * |
| 6th harmonic | -13 | * | * |
| 7th harmonic | -13 | * | * |
| 8th harmonic | -13 | * | * |
| 9th harmonic | -13 | * | * |
| 10th harmonic | -13 | * | * |
| Other Spurs | -13 | -41.6 | -34.6 |
| Other Spurs | -13 | -45.1 | -38.2 |
| Other Spurs | -13 | * | * |
| Other Spurs | -13 | * | * |
| Other Spurs | -13 | * | * |



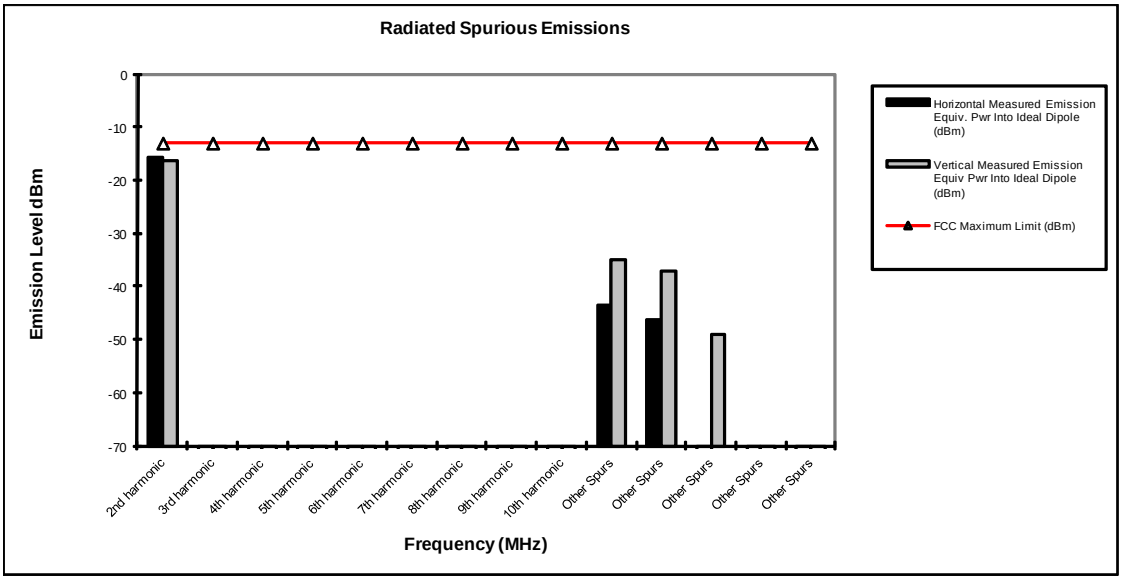

Notes:
1. * Indicates the spurious emission could not be detected due to noise limitations or ambients or the emissions are lower than -33 dBm.
2. Each emission reported reflects the highest absolute level at the specific harmonic for the low, mid, and high channels at maximum power.
3. The Spectrum was investigated from 30 MHz to the tenth harmonic of the fundamental.

The margin with respect to the limit is the minimum margin for all modes and bands.

**Measurement Results –EDGE 1900; Y plane**

## Radiated Spurious and Harmonic Emissions

| Frequency (MHz) | FCC Maximum Limit (dBm) | Horizontal Measured Emission Equiv. Pw r Into Ideal Dipole (dBm) | Vertical Measured Emission Equiv Pw r Into Ideal Dipole (dBm) |
|---|---|---|---|
| 2nd harmonic | -13 | -15.7 | -16.4 |
| 3rd harmonic | -13 | * | * |
| 4th harmonic | -13 | * | * |
| 5th harmonic | -13 | * | * |
| 6th harmonic | -13 | * | * |
| 7th harmonic | -13 | * | * |
| 8th harmonic | -13 | * | * |
| 9th harmonic | -13 | * | * |
| 10th harmonic | -13 | * | * |
| Other Spurs | -13 | -43.5 | -35.0 |
| Other Spurs | -13 | -46.4 | -37.2 |
| Other Spurs | -13 | * | -49.0 |
| Other Spurs | -13 | * | * |
| Other Spurs | -13 | * | * |




Notes:

1. * Indicates the spurious emission could not be detected due to noise limitations or ambients or the emissions are lower than -33 dBm.
2. Each emission reported reflects the highest absolute level at the specific harmonic for the low, mid, and high channels at maximum power.
3. The Spectrum was investigated from 30 MHz to the tenth harmonic of the fundamental.

The margin with respect to the limit is the minimum margin for all modes and bands.

# FREQUENCY STABILITY

## Measurement Procedure

The EUT is placed in an environmental chamber. The antenna port of the EUT is directly coupled to the input of the measurement equipment through a specialized RF connector. A power supply is attached as the primary voltage supply.

Frequency measurements are made at the extremes of the temperature range -30º C to +60º C and at intervals of 10º C with the primary supply voltage set to the nominal battery operating voltage. A period of time sufficient to stabilize all components of the equipment is allowed at each frequency measurement. The maximum variation of frequency is measured.

At room temperature, the primary supply voltage is reduced to the battery operating endpoint of the equipment under test. The maximum variation of frequency is measured. A battery eliminator was used for the input supply voltage.

## Measurement Results

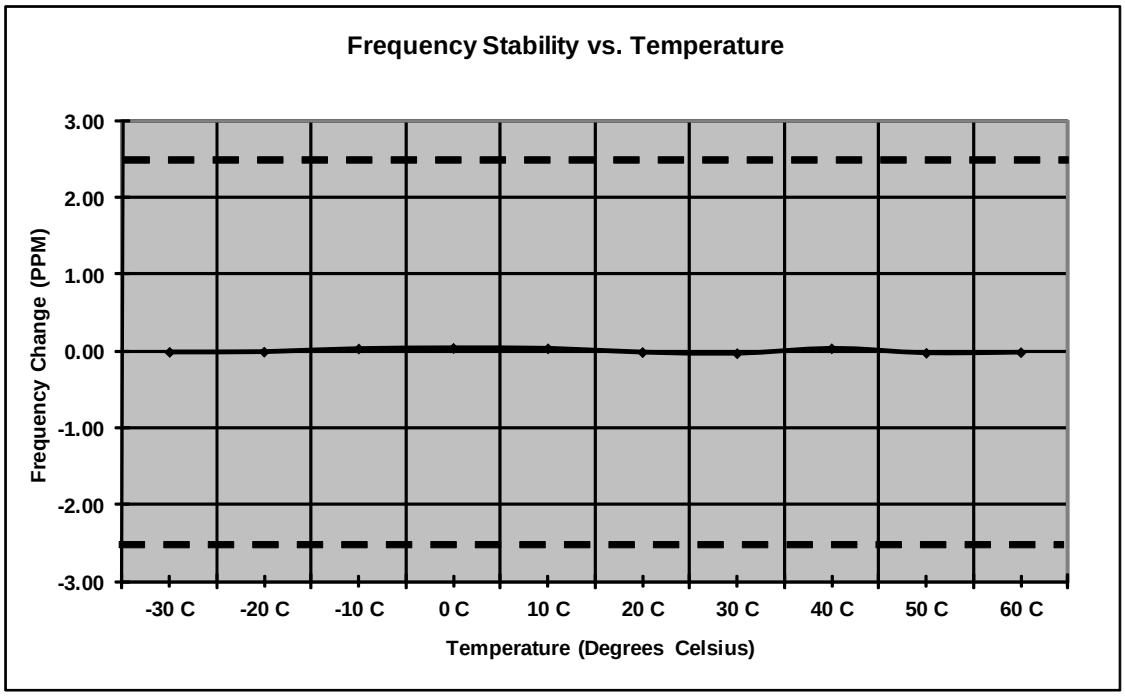
Attached

**Measurement Results**
**Modulation: GSM 850**

# Frequency Stability

**Mode:** GSM 850 **Operating Frequency:** 836.6 MHz
**Channel:** 190 **Deviation Limit (PPM):** ±2.5ppm

| Temperature | Frequency Error | Frequency Error | Voltage | Voltage |
|---|---|---|---|---|
| C | HZ | (PPM) | (%) | (VDC) |
| | | | | |
| -30 C | **-18.07** | **-0.022** | 100% | 3.80 |
| -20 C | **-15.26** | **-0.018** | 100% | 3.80 |
| -10 C | **18.50** | **0.022** | 100% | 3.80 |
| 0 C | **25.78** | **0.031** | 100% | 3.80 |
| 10 C | **21.32** | **0.025** | 100% | 3.80 |
| 20 C | **-19.97** | **-0.024** | 100% | 3.80 |
| 30 C | **-32.38** | **-0.039** | 100% | 3.80 |
| 40 C | **21.50** | **0.026** | 100% | 3.80 |
| 50 C | **-27.15** | **-0.032** | 100% | 3.80 |
| 60 C | **-20.86** | **-0.025** | 100% | 3.80 |
| | | | | |
| 20 C | **-24.18** | **-0.029** | Battery Endpoint | 3.42 |

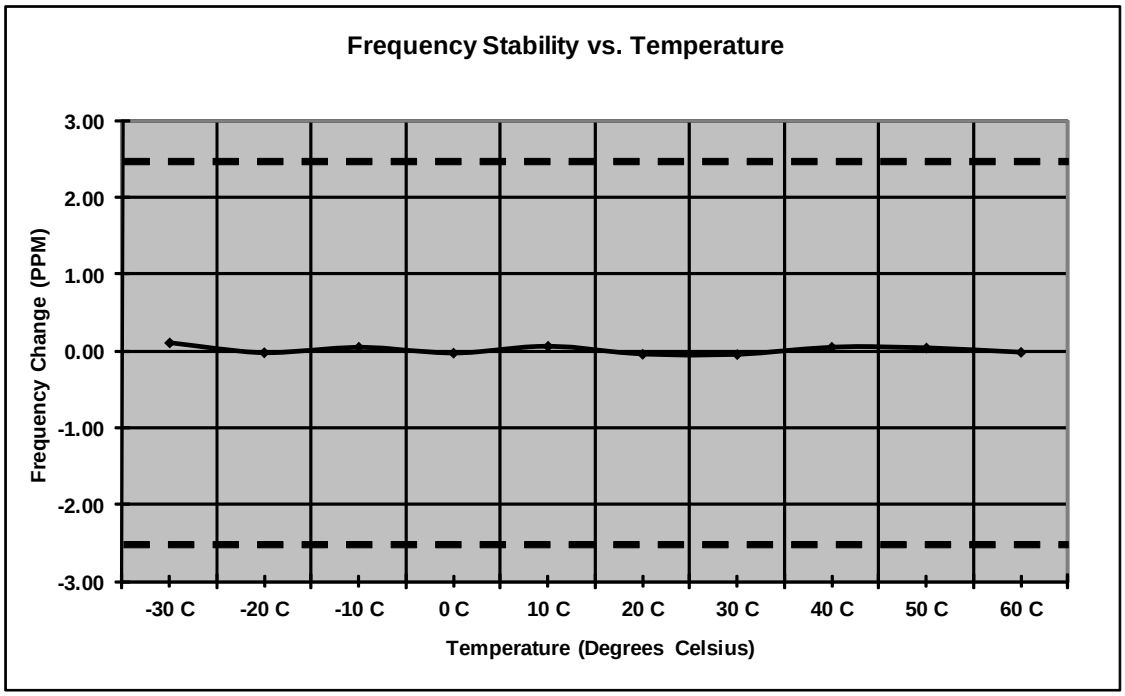


**Measurement Results**
**Modulation: EDGE 850**

# Frequency Stability

**Mode:** EDGE 850 **Operating Frequency:** 836.6 MHz
**Channel:** 190 **Deviation Limit (PPM):** ±2.5ppm

| Temperature | Frequency Error | Frequency Error | Voltage | Voltage |
|---|---|---|---|---|
| C | HZ | (PPM) | (%) | (VDC) |
| | | | | |
| -30 C | **85.07** | **0.102** | 100% | 3.80 |
| -20 C | **-21.90** | **-0.026** | 100% | 3.80 |
| -10 C | **37.18** | **0.044** | 100% | 3.80 |
| 0 C | **-26.35** | **-0.031** | 100% | 3.80 |
| 10 C | **48.58** | **0.058** | 100% | 3.80 |
| 20 C | **-38.83** | **-0.046** | 100% | 3.80 |
| 30 C | **-41.74** | **-0.050** | 100% | 3.80 |
| 40 C | **36.98** | **0.044** | 100% | 3.80 |
| 50 C | **29.58** | **0.035** | 100% | 3.80 |
| 60 C | **-18.40** | **-0.022** | 100% | 3.80 |
| | | | | |
| 20 C | **41.59** | **0.050** | Battery Endpoint | 3.42 |

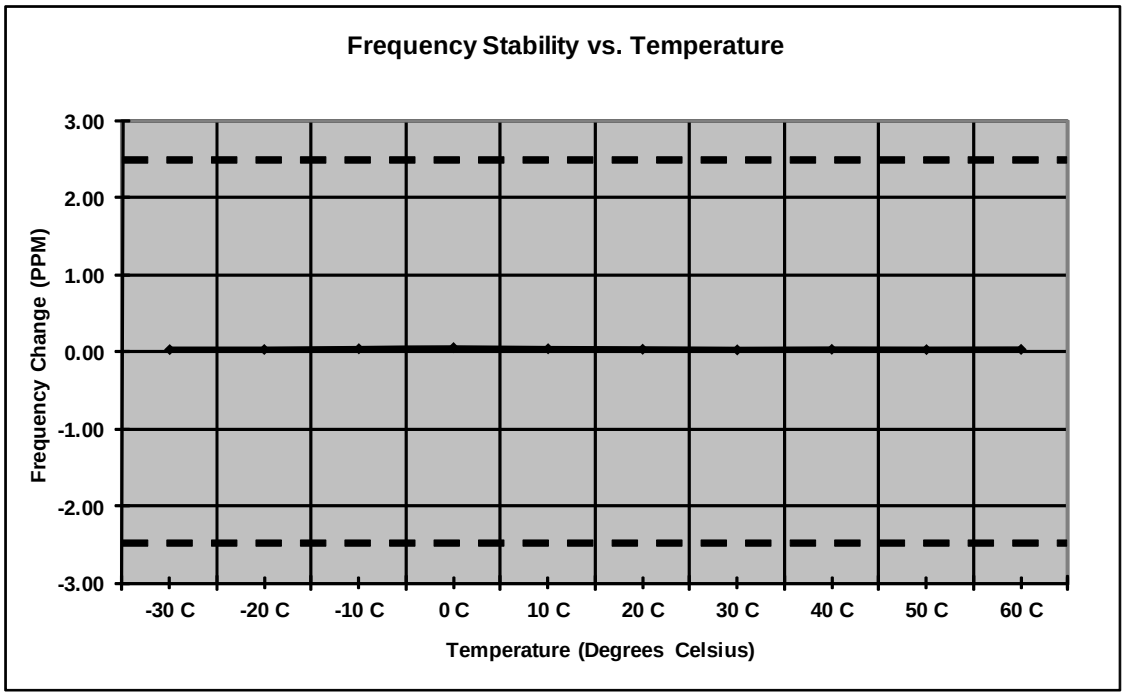


**Measurement Results**
**Modulation: GSM 1900**

# Frequency Stability

**Mode:** GSM 1900 **Operating Frequency:** 1880.0 MHz
**Channel:** 661 **Deviation Limit (PPM):** ±2.5ppm

| Temperature | Frequency Error | Frequency Error | Voltage | Voltage |
|---|---|---|---|---|
| C | HZ | (PPM) | (%) | (VDC) |
| | | | | |
| -30 C | **47.55** | **0.025** | 100% | 3.80 |
| -20 C | **48.70** | **0.026** | 100% | 3.80 |
| -10 C | **70.14** | **0.037** | 100% | 3.80 |
| 0 C | **94.55** | **0.050** | 100% | 3.80 |
| 10 C | **68.58** | **0.036** | 100% | 3.80 |
| 20 C | **57.86** | **0.031** | 100% | 3.80 |
| 30 C | **39.55** | **0.021** | 100% | 3.80 |
| 40 C | **53.41** | **0.028** | 100% | 3.80 |
| 50 C | **46.44** | **0.025** | 100% | 3.80 |
| 60 C | **51.73** | **0.028** | 100% | 3.80 |
| | | | | |
| 20 C | **59.74** | **0.032** | Battery Endpoint | 3.42 |

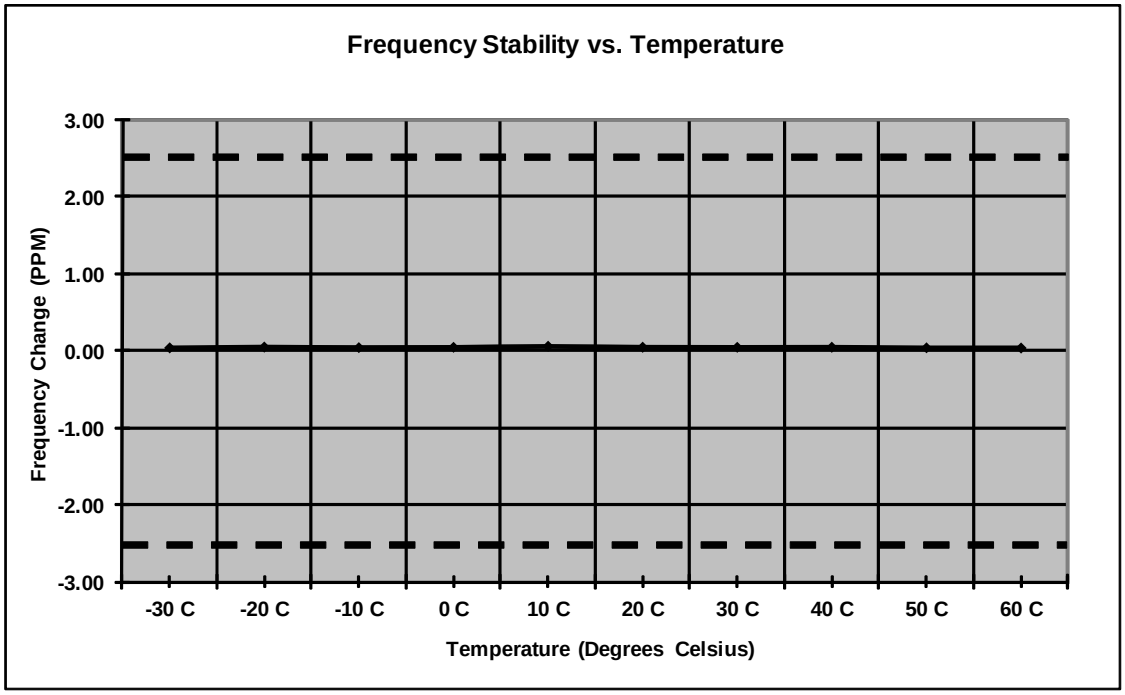


**Measurement Results**
**Modulation: EDGE 1900**

# Frequency Stability

**Mode:** EDGE 1900 **Operating Frequency:** 1880.0 MHz
**Channel:** 661 **Deviation Limit (PPM):** ±2.5ppm

| Temperature | Frequency Error | Frequency Error | Voltage | Voltage |
|---|---|---|---|---|
| C | HZ | (PPM) | (%) | (VDC) |
| | | | | |
| -30 C | **58.57** | **0.031** | 100% | 3.80 |
| -20 C | **78.83** | **0.042** | 100% | 3.80 |
| -10 C | **66.15** | **0.035** | 100% | 3.80 |
| 0 C | **72.95** | **0.039** | 100% | 3.80 |
| 10 C | **99.63** | **0.053** | 100% | 3.80 |
| 20 C | **76.58** | **0.041** | 100% | 3.80 |
| 30 C | **73.22** | **0.039** | 100% | 3.80 |
| 40 C | **75.77** | **0.040** | 100% | 3.80 |
| 50 C | **62.09** | **0.033** | 100% | 3.80 |
| 60 C | **56.79** | **0.030** | 100% | 3.80 |
| | | | | |
| 20 C | **85.94** | **0.046** | Battery Endpoint | 3.42 |

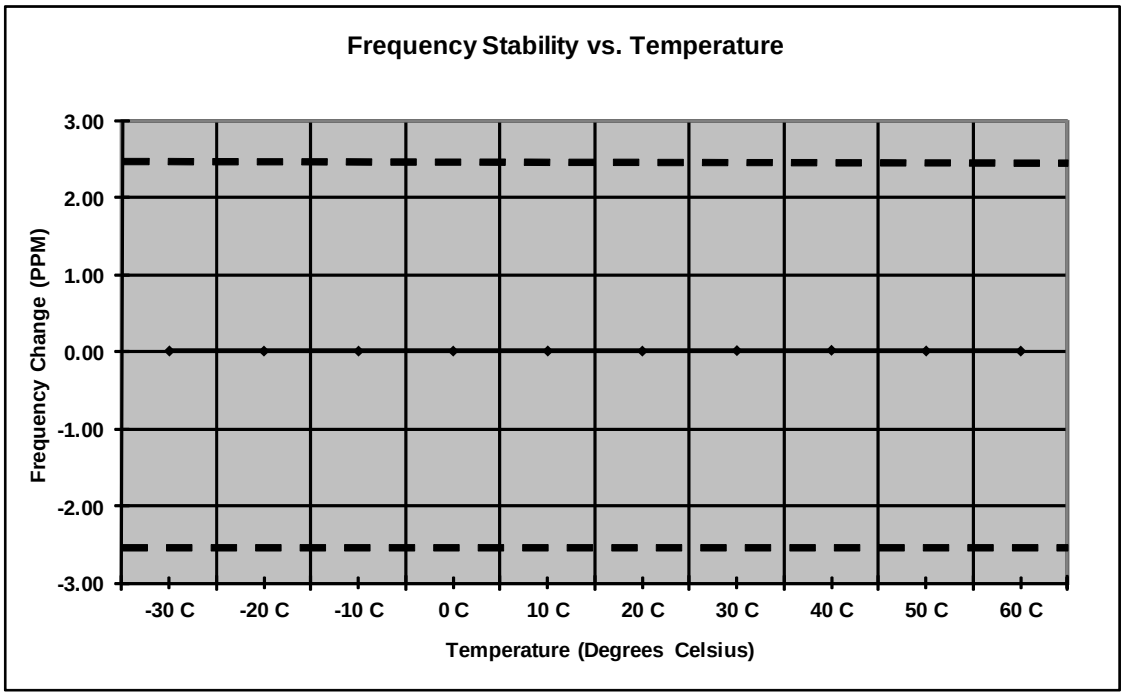


**Measurement Results**
**Modulation: WCDMA 850**

# Frequency Stability

**Mode:** 850 WCDMA **Operating Frequency:** 836
**Channel:** 4180 **Deviation Limit (PPM):** ±2.5ppm

| Temperature | Frequency Error | Frequency Error | Voltage | Voltage |
|---|---|---|---|---|
| C | HZ | (PPM) | (%) | (VDC) |
| | | | | |
| -30 C | **5.46** | **0.007** | 100% | 3.80 |
| -20 C | **4.58** | **0.005** | 100% | 3.80 |
| -10 C | **4.76** | **0.006** | 100% | 3.80 |
| 0 C | **4.81** | **0.006** | 100% | 3.80 |
| 10 C | **5.46** | **0.007** | 100% | 3.80 |
| 20 C | **5.35** | **0.006** | 100% | 3.80 |
| 30 C | **9.86** | **0.012** | 100% | 3.80 |
| 40 C | **13.48** | **0.016** | 100% | 3.80 |
| 50 C | **5.47** | **0.007** | 100% | 3.80 |
| 60 C | **4.93** | **0.006** | 100% | 3.80 |
| | | | | |
| 20 C | **4.73** | **0.006** | Battery Endpoint | 3.42 |

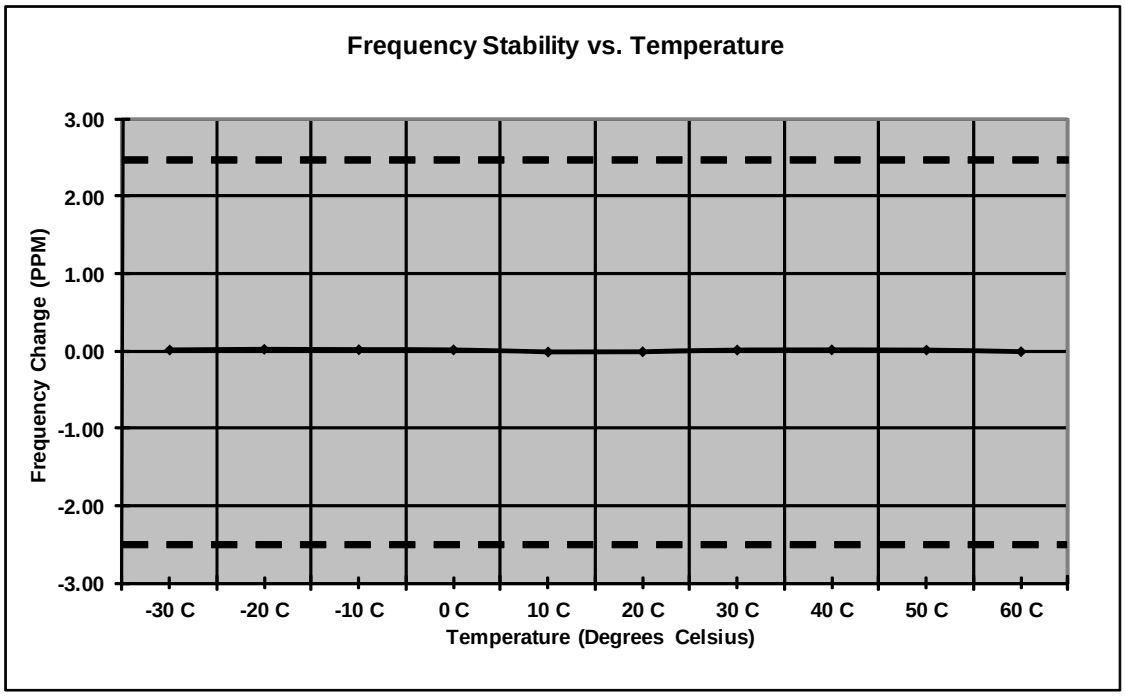


**Measurement Results**
**Modulation: WCDMA 1700**

# Frequency Stability

**Mode:** WCDMA 1700 **Operating Frequency:** 1732.5 MHz
**Channel:** 1413 **Deviation Limit (PPM):** ±2.5ppm

| Temperature | Frequency Error | Frequency Error | Voltage | Voltage |
|---|---|---|---|---|
| C | HZ | (PPM) | (%) | (VDC) |
| | | | | |
| -30 C | **8.46** | **0.010** | 100% | 3.80 |
| -20 C | **15.35** | **0.018** | 100% | 3.80 |
| -10 C | **11.29** | **0.013** | 100% | 3.80 |
| 0 C | **9.03** | **0.011** | 100% | 3.80 |
| 10 C | **-13.34** | **-0.016** | 100% | 3.80 |
| 20 C | **-11.54** | **-0.014** | 100% | 3.80 |
| 30 C | **8.34** | **0.010** | 100% | 3.80 |
| 40 C | **8.88** | **0.011** | 100% | 3.80 |
| 50 C | **7.16** | **0.009** | 100% | 3.80 |
| 60 C | **-10.05** | **-0.012** | 100% | 3.80 |
| | | | | |
| 20 C | **10.32** | **0.012** | Battery Endpoint | 3.42 |

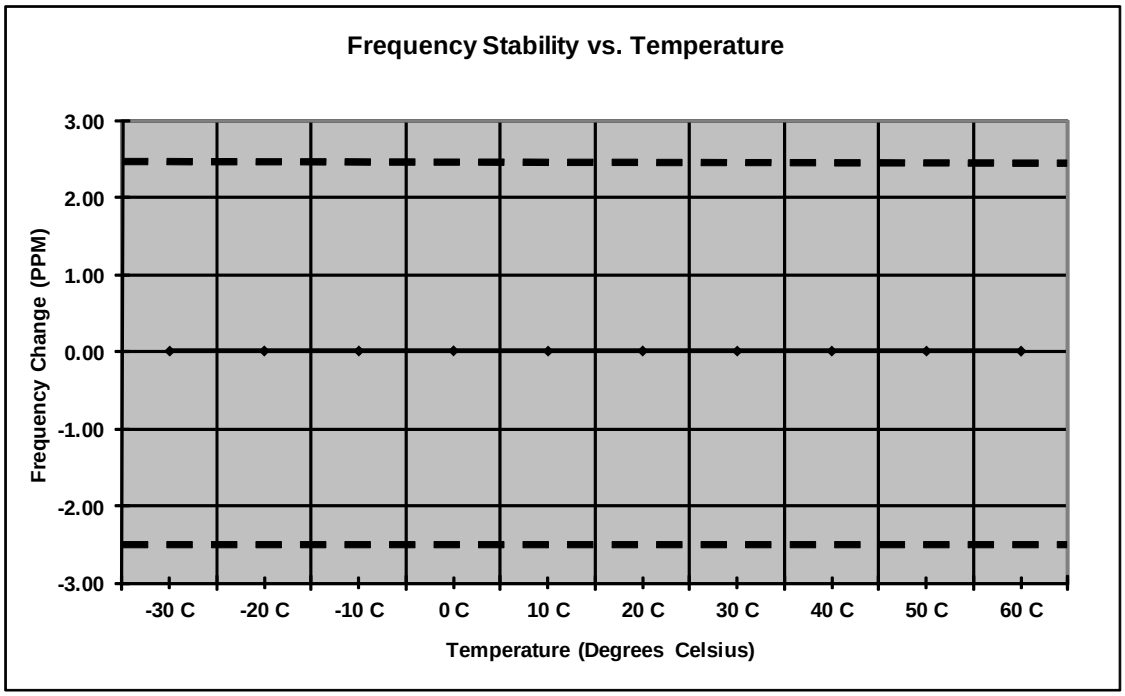


**Measurement Results**
**Modulation: WCDMA 1900**

# Frequency Stability

**Mode:** WCDMA 1900 **Operating Frequency:** 1880.0 MHz
**Channel:** 9400 **Deviation Limit (PPM):** ±2.5ppm

| Temperature | Frequency Error | Frequency Error | Voltage | Voltage |
|---|---|---|---|---|
| C | HZ | (PPM) | (%) | (VDC) |
| | | | | |
| -30 C | **10.79** | **0.006** | 100% | 3.80 |
| -20 C | **13.63** | **0.007** | 100% | 3.80 |
| -10 C | **12.74** | **0.007** | 100% | 3.80 |
| 0 C | **18.24** | **0.010** | 100% | 3.80 |
| 10 C | **11.33** | **0.006** | 100% | 3.80 |
| 20 C | **12.62** | **0.007** | 100% | 3.80 |
| 30 C | **10.17** | **0.005** | 100% | 3.80 |
| 40 C | **10.81** | **0.006** | 100% | 3.80 |
| 50 C | **11.46** | **0.006** | 100% | 3.80 |
| 60 C | **9.19** | **0.005** | 100% | 3.80 |
| | | | | |
| 20 C | **10.44** | **0.006** | Battery Endpoint | 3.42 |



**End of Test Report**